DETROIT PUBLIC LIBRARY
AUG 22 1961
TECHNOLOGY DEPARTMENT

AUGUST 1961

THE PAPER INDUSTRY

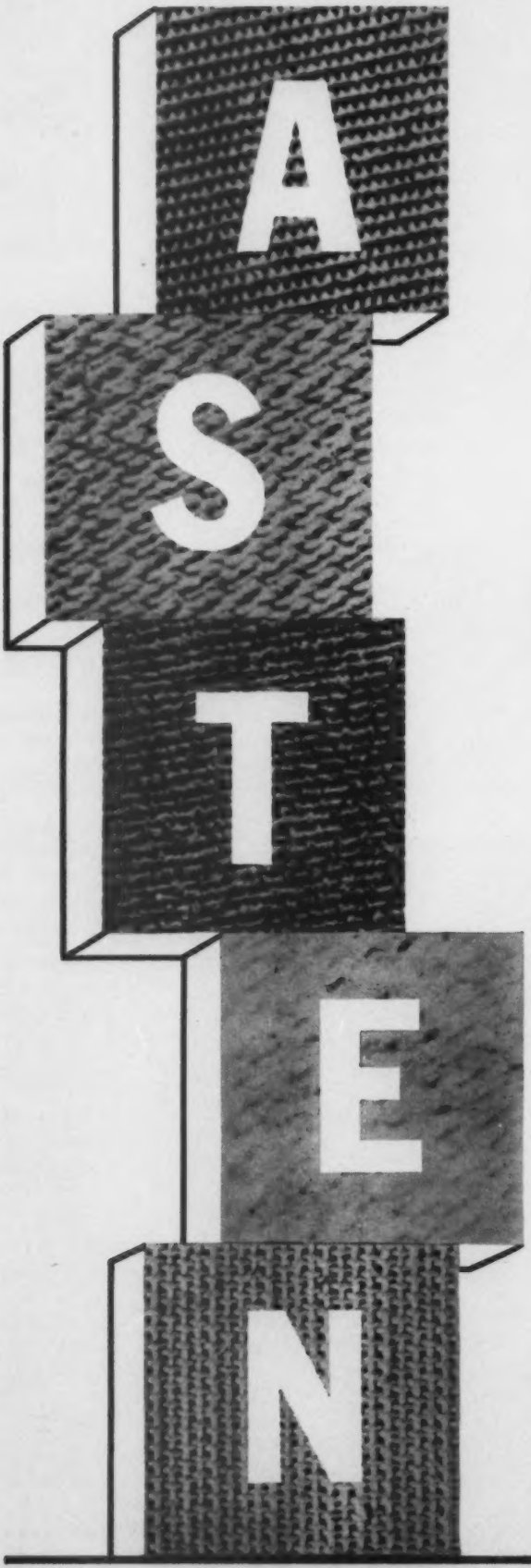
Tennessee River's new board mill

Behavior of coating mixtures on the machine

I.P.C.'s pulpwood plantation

How to determine comparison ratios

Publishers of PAPER AND PULP MILL CATALOGUE



build paper-making profits with the exact ASTEN Dryer Felts for your needs

All types for all purposes

SYNBEST®/SYNCOT®

ASBESTOS / SYNTHETIC

"Economy in the long run"

ASTEN-HILL MFG. CO. Philadelphia 29, Pa.
Walterboro, S. C.
Salem, Ore.

ASTEN-HILL LIMITED Valleyfield, Que.

• FREE SEAM BOOK—Write today for your copy of 28-page book on dryer felt seams.

For more data circle 101 on Post Card

This is AMERICAN OIL COMPANY

Our organization has more than 70 years' experience in the oil business. We are one of the largest petroleum organizations in America.

We believe the experienced American Oil representative who calls on you, plus the products and facilities which he has at his disposal, are reasons why you will like to do business with us.

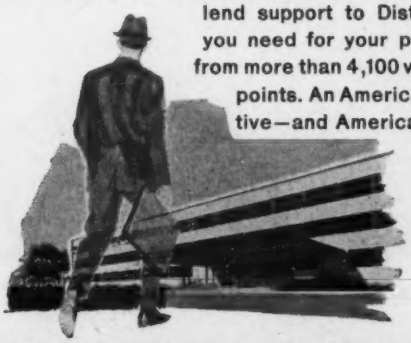
Your American Oil representative receives special training for his job at our Sales Engineering School. He is given concentrated basic instruction in all phases of petroleum product quality and application. According to a planned schedule, he returns for an advanced course and then again for post-graduate work.

In our Marketing Technical Service Department are specialists who are recognized authorities in their fields. These senior consultants may be called in to work with you on any specialized problem.

More than 1,000 research scientists and technicians are at work in our research laboratories developing new products and finding ways to improve present products. Their mission: To help your American Oil representative help you lower your maintenance costs and stretch your maintenance dollars.

Twelve American Oil refineries give flexibility to the production of petroleum products for industry. They help make it possible to assure prompt delivery. Upwards of 2,875 miles of product pipelines augment delivery facilities.

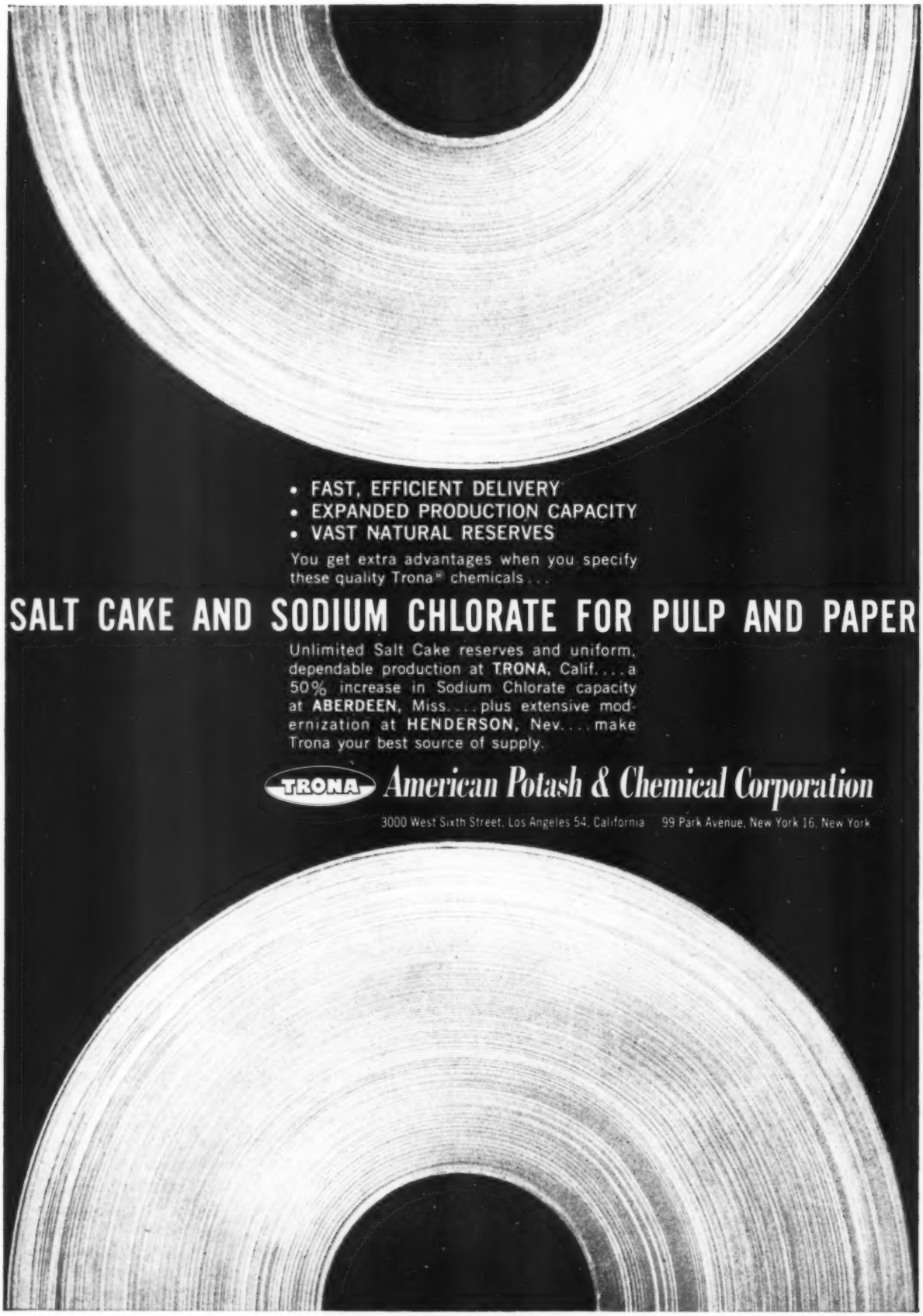
American Oil representatives operate from 74 District Offices. Thirteen Regional Offices strategically located throughout the country lend support to District Offices. The products you need for your plant or fleet are available from more than 4,100 warehouses and distribution points. An American Oil Company representative—and American Oil products—are only a telephone call from your office. We invite you to make that phone call. Or write **American Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.**



AMERICAN

AMERICAN OIL COMPANY

For more data circle 102 on Post Card


• FAST, EFFICIENT DELIVERY
• EXPANDED PRODUCTION CAPACITY
• VAST NATURAL RESERVES
You get extra advantages when you specify these quality Trona® chemicals . . .
SALT CAKE AND SODIUM CHLORATE FOR PULP AND PAPER
Unlimited Salt Cake reserves and uniform, dependable production at TRONA, Calif. . . . a 50% increase in Sodium Chlorate capacity at ABERDEEN, Miss. . . . plus extensive modernization at HENDERSON, Nev. . . . make Trona your best source of supply.
TRONA
American Potash & Chemical Corporation
3000 West Sixth Street, Los Angeles 54, California
99 Park Avenue, New York 16, New York

For more data circle 103 on Post Card

VOL. 43 NO. 5 AUGUST 1961

Published monthly by:
FRITZ PUBLICATIONS, INC.
Edward B. Fritz (1869-1939), founder

PUBLICATION STAFF:

President and General Manager
A. SCOTT DOWD

Secretary
EDLA DURBON

•

Editorial Director
A. W. J. DYCK, Ph.D.

News Editor
BRUCE H. BRAMMER

Editorial Assistant
SUSAN E. HENRY

•

Advertising Manager
CHARLES E. DOWD

Production Manager
SEVER M. PEDERSON

Circulation Manager
JOHN H. REARDON

Assistant Circulation Manager
LEONA M. NUTTALL

ADVERTISING REPRESENTATIVES:

CHICAGO 5, ILL.
JACK HENDERSON
431 South Dearborn Street
Wabash 2-3543

CLEVELAND 7, OHIO
RICHARD E. CLEARY INC.
15515 Detroit Avenue
Lakewood 1-7125

NEW YORK 17, N.Y.
CHARLES G. PECK
299 Madison Avenue
Murray Hill 2-2499

BIRMINGHAM 16, ALA.
FRED W. SMITH
1201 Forest View Lane—Vesthaven
822-3804

PASADENA, CALIF.
MURRAY BOTHWELL
234 East Colorado St.
Murray 1-9155

THE PAPER INDUSTRY—founded in 1919—known as "The Paper Industry and Paper World" from June, 1939, through December, 1949, assumed its original title with the January, 1950, issue.

Published at 1501 Washington Road, Mendota, Illinois.

Address all correspondence to:
Fritz Publications, Inc.
431 South Dearborn Street
Chicago 5, Illinois

Member: Business Publications Audit of Circulation Inc.

Accepted as controlled circulation publication at Mendota, Ill.

Subscription rates: United States, U. S. Possessions and Canada $3.00 for one year. All other countries, $8.00 for one year, $18.00 for three years, payable in advance in U. S. Funds.

The PAPER INDUSTRY is indexed regularly in Engineering Index and Industrial Arts Index. An index to each volume is issued annually by the publisher as a part of the April number. ©1961 by Fritz Publications, Inc.

contents

FEATURES

289 Editorial: How can we cure "Technophobia"?

340 Whither?: Male gypsy-moths—beware of "gyplure" — Scientific measurement of forest mechanization — Extensible-paper improvements — Increased use of cotton linters — Newsprint production up

295 Tennessee River Pulp & Paper Co. in full kraft-linerboard production

305 Rheology of paper coatings: Part VII—Behavior of coating mixtures on the coating machines — *R. A. Diehm*

307 How to determine comparison ratios — *Charles C. Moffatt*

308 Miniature pulpwood plantation—after twenty years — *Irving H. Isenberg*

312 Albany Felt round table—*continued from July issue.*

NEWS

315 Industry news

315 Sprout, Waldron announces pelleting process

315 New national trade association

316 Recent expansions

316 Field Paper now operating in new plant

318 Potlatch—first to install new digester

321 Names in the news

338 Necrology

DEPARTMENTS

313 Current comments

320 Coming events

322 Foreign abstracts

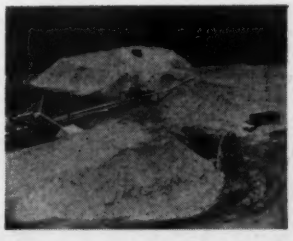
324 Patent reviews

325 New products

333 New literature

337 Market quotations

339 Index to advertisers



FRONT COVER — View of Tennessee River's outside chip storage system. See page 295.

Buyer's Memo to Himself:

Need thoroughly tested raw materials Call Marathon

Marathon research and production facilities, testing laboratories and trained technicians are working constantly—experimenting and testing in an endless search for better and better products—to continue to give the converter the advantages of the finest paper and paperboard in the industry for his converting operations.

Keep Marathon in mind for pulp, printing papers, paperboard and specialty materials.

A DEPENDABLE SOURCE FOR QUALITY CONVERTING MATERIALS

Pulp, Paper and Paperboard Department

marathon

A Division of American Can Company

MENASHA, WISCONSIN

For more data circle 104 on Post Card

from our point of view

How can we cure "Technophobia"?

An article entitled "Management's Fight Against Technophobia", by A. M. Sullivan, which appeared in Dun's Review, focuses attention on a problem that is acquiring ever-increasing prominence with the current trend toward mechanization and automation in the pulp and paper manufacturing industry.

The trend toward mechanization and automation is and will continue to be with us. There is nothing to stop it. Actually, as competition for markets increases and as the national interests become even more vitally dependent on efficient operations and increased output of quality products, this trend is bound to be further accelerated.

What then can be done to dispel the public's fear of technological innovations that continuously threaten to dislocate or even abolish jobs at ever-increasing frequency.

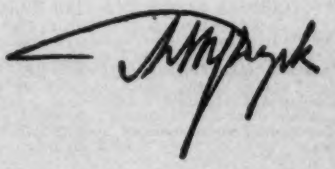
Sullivan's solution, that management pay as much attention to psychology as it does to technology and that it keep the public and labor informed of its planned program of technological changes and what this will mean to the employees, would undoubtedly remove some of the workers' anxiety and contribute to a better morale.

However, even the best of communications systems directed toward the achievement of this end could do no more than only alleviate some fears. The complexity of modern life is rapidly becoming such that many workers, if left to their own initiative, experience great difficulty in finding their way and adjusting to new areas of occupation. No amount of forewarning or explanation by management of the necessity of pending relocation will make it any easier for them. What consolation is it to the workers to know that, for every job abolished by technological innovations, there are two or more new jobs created as a result of this same innovation — if it is not within their capacity to find or qualify for the new jobs?

It seems to us that the problem arising from the resistance to change and the fear of mechanization and automation, inherent in labor as well as in some management circles, can be solved only if education, re-training and relocation of those concerned be made a national responsibility.

The best facilities for education, full employment and maximum productivity must be considered among this nation's foremost assets and as such become a direct responsibility of the Federal Government. It could well be that, if given the deserved consideration at this level, some workable plan might be evolved that would completely allay public fears and eliminate the resistance to mechanization and automation.

We feel that the creation of new jobs and their procurement deserves a national effort of at least the same, if not greater, magnitude as that accorded to unemployment compensation and community aid. Actually, an all-out national effort toward the implementation of some such program might, in addition to making labor more receptive to technological changes, also reduce the need for unemployment benefit payments, etc., to an insignificant minimum.



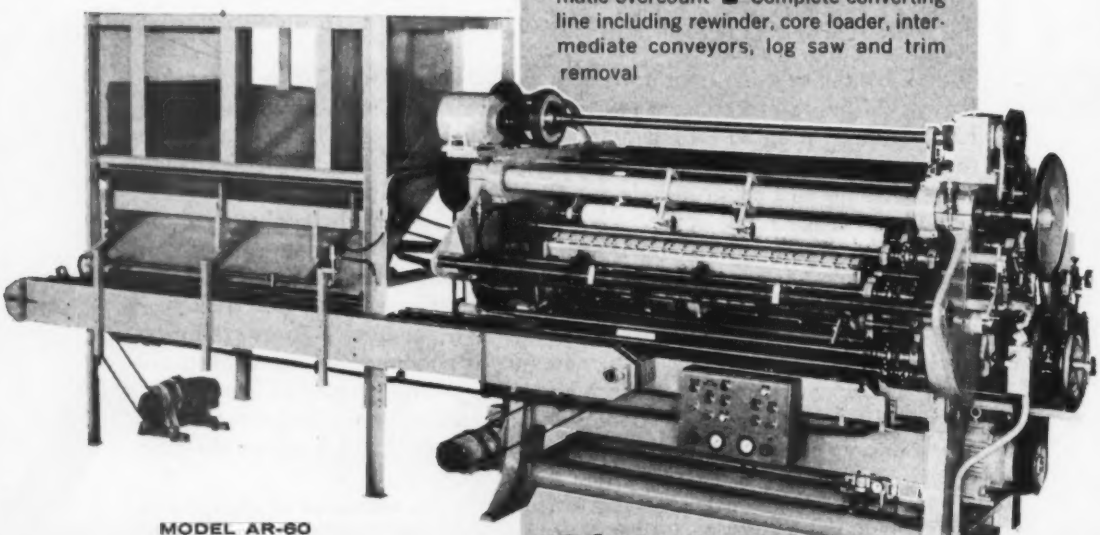
Automatic

REWINDER and CORE LOADER

■ **100 CASES OF TISSUE PER HOUR with one operator and a pair of rewinders***

■ Automatic full speed, web transfer with positive cut-off and absolutely accurate count ■ Automatic core loading, roll stripping, log transfer, cull discharge with mandrels mounted in turret — no manual labor ■ Soft rolls for latest consumer preference and shear-cut perforator for positive easy sheet tear-off ■ Shaftless unwind up to 72" diameter ■ Automatic constant tension unwind control ■ Finished roll diameter control through automatic overcount ■ Complete converting line including rewinder, core loader, intermediate conveyors, log saw and trim removal

*Actual production figures based on 4½" x 4½" sheet size, 650 count rolls – 96 roll cases off 2-81" rewinders.



MODEL AR-60

■ For use with toilet tissue, toweling, locker wrap, aluminum foil, polyethylene, gift wrap, waxed paper and other roll products.

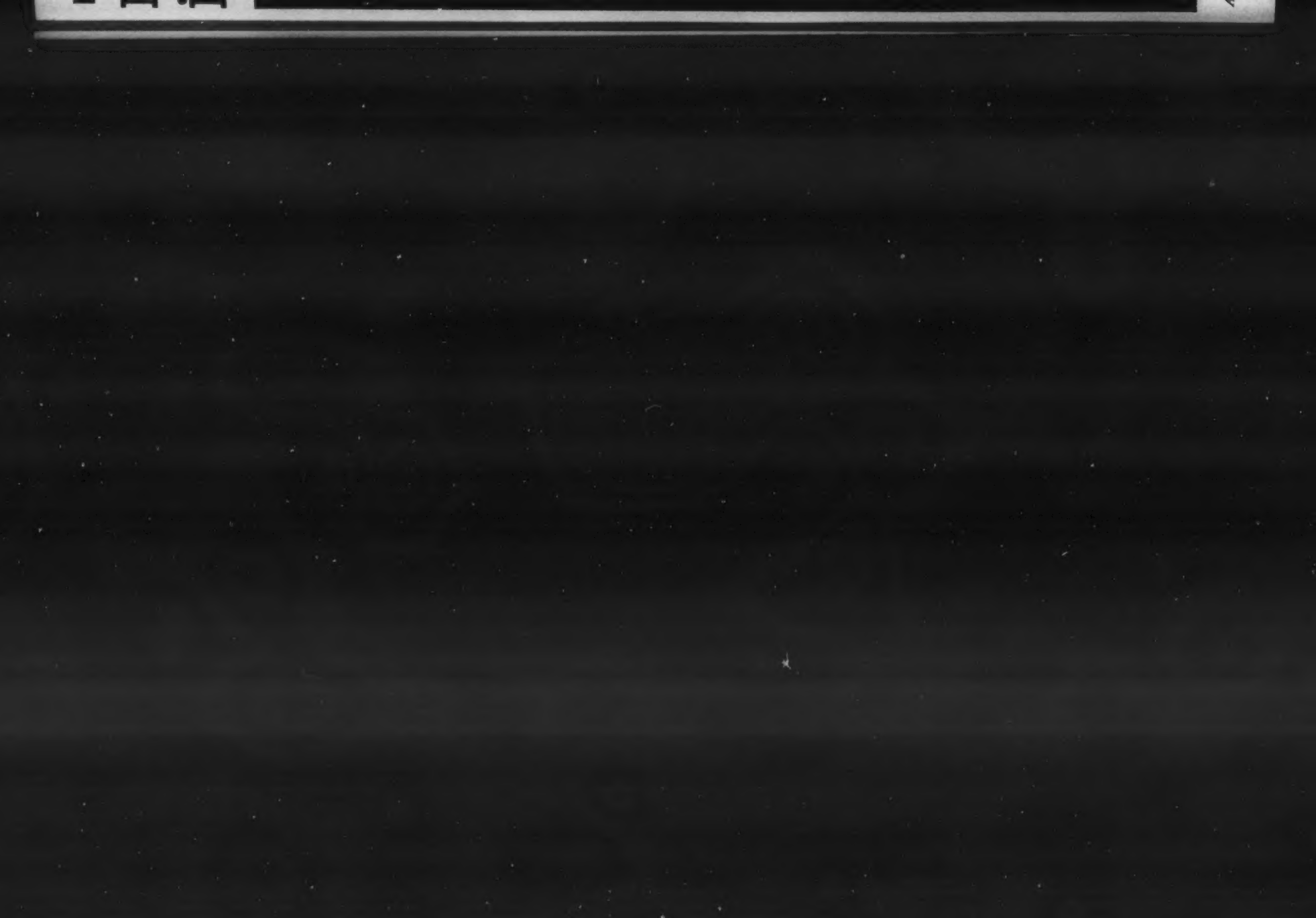
WANT TO KNOW MORE? Please call or write and we'll send you complete information and specifications.

FOLDERS, REWINDERS, EMBOSSERS, NAPKIN AND CORE MACHINES, LETTERPRESS AND FLEXOGRAPHIC PRESSES, SPECIAL CONVERTING MACHINERY.

creative engineering and development of converting machinery since 1919

Paper Converting MACHINE COMPANY
GREEN BAY, WISCONSIN

For more data circle 105 on Post Card



LINK-BELT SPHERICAL ROLLER BEARINGS:

measure these design values in terms of your applications

LINK-BELT SPHERICAL ROLLER BEARING PILLOW BLOCKS

Made with sturdy gray iron or super-rugged cast-steel housings. Adapter mounting types for shafts from 1 15/16" to 10 1/2" and direct-shaft mounting types for shafts from 1.7717" to 11.0236". Choice of rugged steel, multi-labyrinth or Dacron-contact seals.

GREATER CAPACITY!

The reason? *More rollers, larger rollers!* Bearing capacity depends primarily on effective roller Length, roller Diameter and Number of rollers (L x D x N). And Link-Belt offers the *largest effective roller complement* for all sizes of spherical roller bearings . . . rated according to accepted formulas of the Anti-Friction Bearing Manufacturers Association. This increase in LDN values provides extremely high capacity . . . and in users' evaluation, it adds up to far longer bearing life.

GREATER DURABILITY!

With balanced proportion design, Link-Belt spherical roller bearings possess durability characteristics that exceed the bearing industry's exacting requirements. Optimum balance of rollers, inner and outer rings must be obtained for increased bearing capacity . . . yet overall bearing dimensions must conform to an established international standard boundary plan.

Wrap-around, completely contoured retainers also contribute to durability through positive roller guidance and spacing. Precision-machined of centrifugally cast bronze, these husky retainers are far stronger than stampings or sand castings.

GREATER PRECISION!

Link-Belt spherical roller bearings are made in the world's most modern bearing plant . . . with the most-advanced tools and techniques known to industry. A rigid quality control program leaves *nothing* to chance. Each Link-Belt bearing is subjected to *758 actual inspections*. Microsmoothness and precision are continuously scrutinized by automatic machines. Result: these bearings have been specified by leading manufacturers of cranes, shovels, graders, vibrating screens, and steel mill, paper mill and foundry equipment . . . and for high-precision applications such as embossing rolls, printing presses and torque converters.

SEE BOOK 2760 for further precision, durability and high-capacity features. Contact your nearest Link-Belt office or authorized stock-carrying distributor. Look under BEARINGS in the Yellow Pages of your phone book.

LINK-BELT

SELF-ALIGNING BALL AND ROLLER BEARINGS

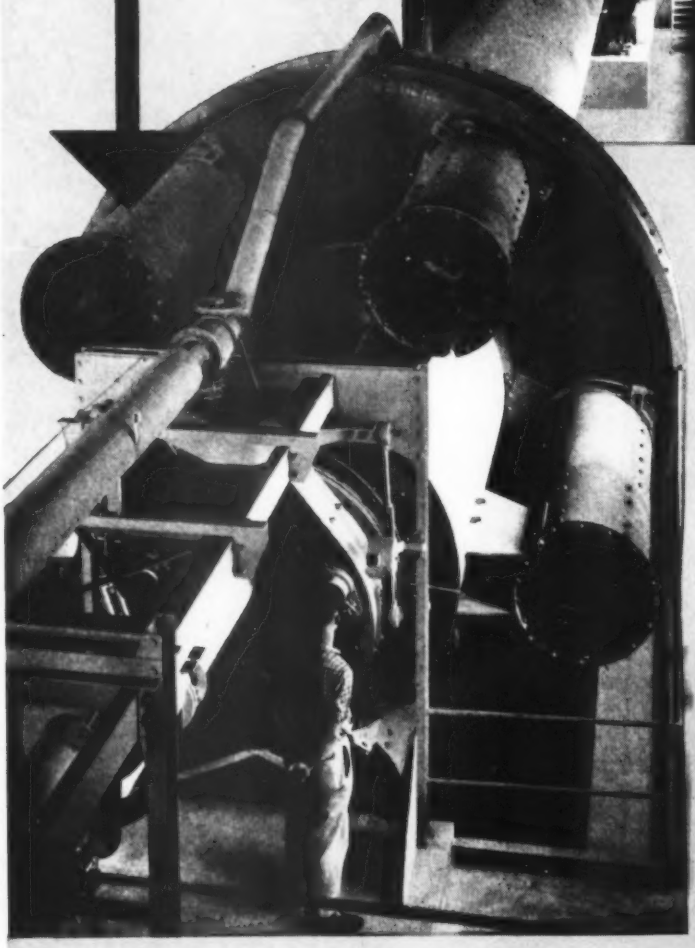
LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs; Switzerland, Geneva. Representatives Throughout the World. 15,001

For more data circle 106 on Post Card

Smidth Unax Coolers

FOR ROTARY KILNS

FOR LIME,
DOLOMITE,
LIME SLUDGE,
ALUMINA,
CEMENT
AND ORES



More than 600 Smidth Unax Kilns supplied in the last thirty years.

Unax cooler affords simple and economical installation; effective cooling and efficient heat recuperation. For many processes it surpasses any other type of cooler for rotary kilns.

Photos: Unax kilns in paper pulp mills

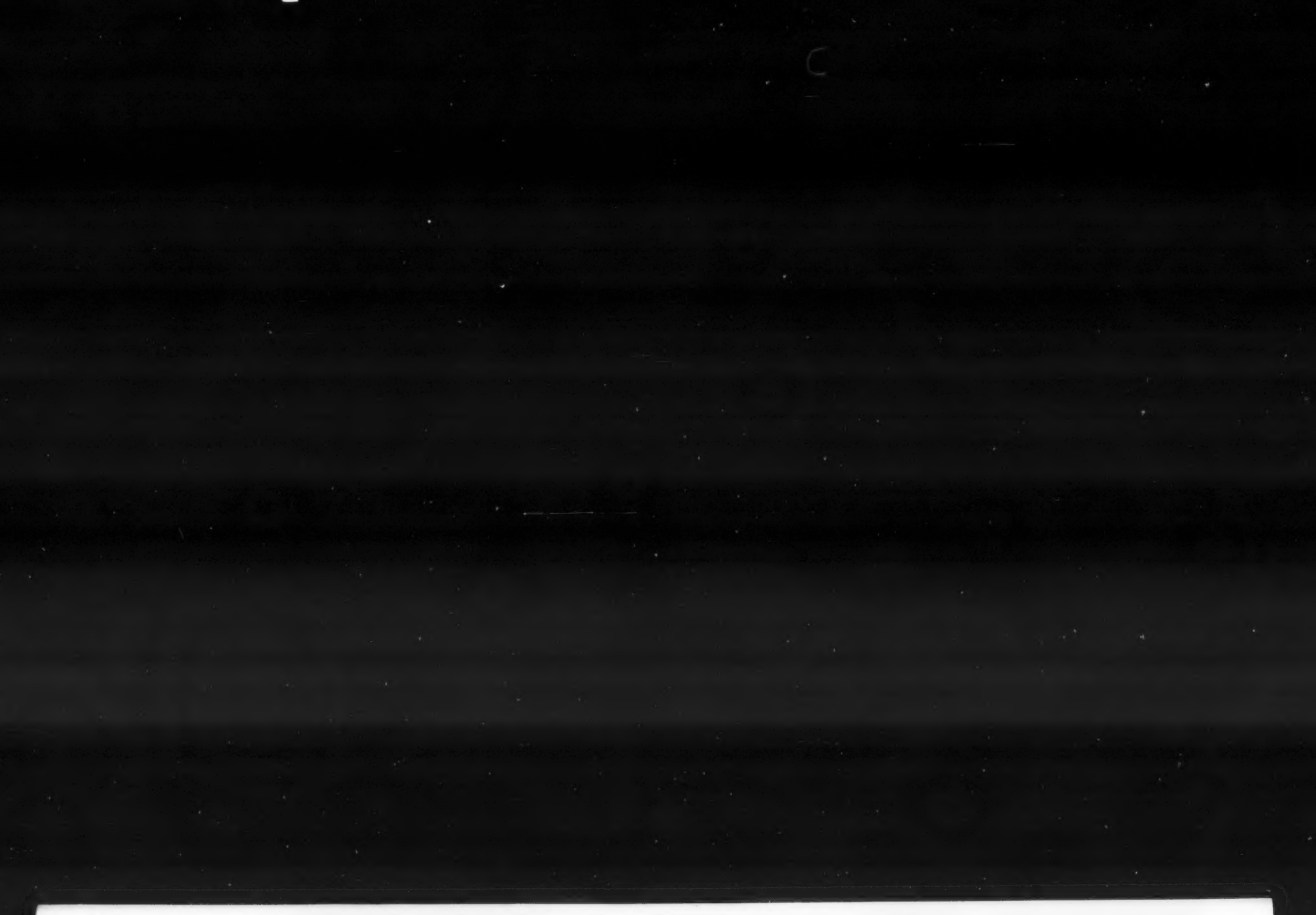
F. L. SMIDTH & CO.

INCORPORATED

ROCKEFELLER CENTER

1270 Ave. of the Americas, New York 20, N. Y.

For more data circle 107 on Post Card



Looking for "Bugs"

in Huyck's Customer Service Department

These men are not entomologists. They are Huyck Customer Service Engineers studying a used felt. Looking for ways to make better felts is their job. They may check portions of this felt in our laboratory for chemical damage, type of plugging material or excessive wear, thus pinpointing causes for removal.

Such unique and complete services complement Huyck's advanced design engineering — further assurance that Huyck performance means High Performance on your machines.

HUYCK FELTS

Huyck Felt Co., Rensselaer, N. Y.; Aliceville, Ala.

Division of Huyck Corporation

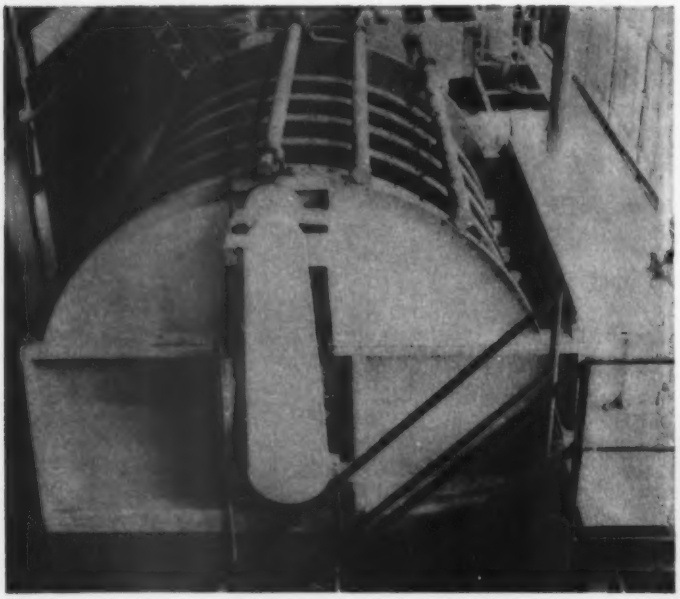
In Canada: Kenwood Mills Limited, Arnprior, Ontario

FIRST IN FELTS SINCE 1870

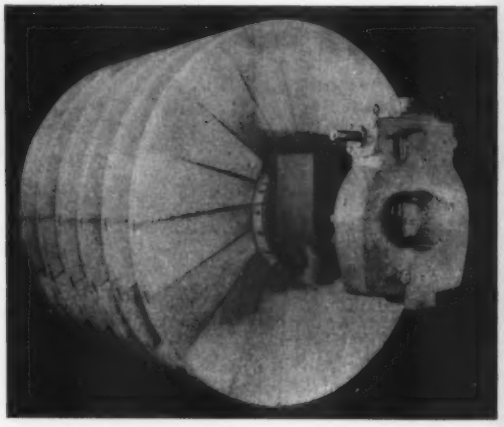
NEW IMPCO

Disc Type Filter Design

At Scott Paper Company, Mobile, Alabama



Molded Discs and One-piece Stainless Core Raise Capacity and Clarity Standards — Due to New Hydrodynamic Design Concept.



Close up your white water system with the new Impco Disc Filter! This saveall concept, with its molded sectors and one-piece stainless core, is a fresh approach to disc type filtering. Hydrodynamic design and latest materials now give you a truly ultramodern filter.

Swept back, molded, lightweight, bonded-face sectors increase capacity and wire life. Contra-flow inlet eliminates pulp thickening in vat. Eighteen ported trunnion and full 180° valve opening produce sharpest filtrate separations. Speeds from ¾ to 4.5 R.P.M. Ask your Impco Sales Engineer for full information and write for Bulletin A5-1.

Above: Six-disc unit minus vat, showing valve and dual filtrate discharge. Filters available in sizes up to sixteen discs. Keyed aligning and attaching device makes assembly of a complete disc the simplest yet. A complete disc consisting of eighteen 22 pound sectors is assembled in one hour.

IMPROVED MACHINERY INC. NASHUA, NEW HAMPSHIRE

IMPCO®

IN CANADA: Sherbrooke Machineries Limited, Sherbrooke, Quebec

For more data circle 109 on Post Card

FEATURE ARTICLES

TENNESSEE RIVER PULP & PAPER CO. IN FULL KRAFT-LINERBOARD PRODUCTION

▶ Outside chip storage; outside location of boilers, evaporators, etc.; hot stock refining and screening; and use of maximum instrumentation are among the innovations that are contributing to the successful operation of the new mill.

TENNESSEE RIVER Pulp & Paper Co.'s new 500 ton/day kraft pulp and paper mill, now in full operation, is designed to produce kraft linerboard of all weights and of the highest quality and uniformity. A combination of a number of operational innovations have made it comparatively easy for the company to enter the linerboard production field competitively. Among these innovations are: outside chip storage; use of maximum instrumentation; outside location of boilers, evaporators, etc; hot stock refining; hot stock screening; and completely remote control of all steps in digesting, refining, screening and washing.

The mill is favorably located with easy access to: (1) an unlimited water supply from a lake formed on the Tennessee River by the Pickwick Dam; (2) economical and reliable power from the T.V.A. system; (3) adequate supplies of pine and hardwoods; (4) excellent water and rail transportation; and (5) a natural gas transmission pipe line.

Tennessee River's executive branch of management consists of G. W. E. Nicholson, president; E. M. Leavitt, vice president and resident manager; and D. W. Maxon, secretary treasurer.

The Production Division includes R. F. Cuyle, general superintendent; H. C. Carter, plant engineer; G. L. Hollimon, pulp mill superintendent; and Frank Jensen, paper mill superintendent.

J. C. Baumgartner is technical superintendent; A. K. Dexter, wood and land manager; N. W. Sentell, asst. wood and land manager; W. W. Vickery, forest management superintendent; and W. E. Gibbons, wood procurement superintendent.

The M. W. Kellogg Co. was selected as the general contractor, while engineering was sub-contracted to H. A. Simons (International) Ltd., Vancouver, B. C.

G. W. E. Nicholson
President

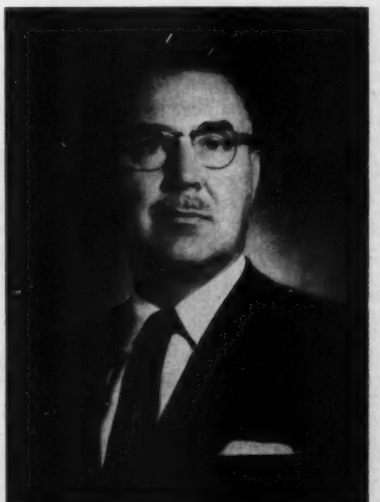
Wood preparation

Wood arrives by rail and truck and is unloaded into a 650-ft.-long concrete flume by means of a rail-mounted wood-rake and two cranes. Two vertical 24 MF Hydro-Foil pumps of 12,000 gpm capacity — each driven by a 100-hp vertical, hollow-shaft motor — draw the water from two grit removal pits and circulate it through the flume. Each of the pumps has a discharge elbow consisting of 17ft. of a 24-in. OD steel column and 3½-in. size shaft-enclosing tubing which encloses the 1 15/16 in. dia. steel line shafting. The pump's bowl assemblies are 24 in. MF, cast iron, with steel impellers and steel fittings.

The 12-ft. by 12-ft. deep grit removal pits are equipped with drag type grit removal conveyors and two revolving disc screens. The latter are 10 ft. 7 in. in dia., operate at 0.6 rpm and are equipped with a spray system to wash the screened bark debris into a trough for removal.

A 140-ft. chain conveyor conveys the logs from the flume to 12-ft. dia. 67½-ft. long twin barking drums, each consisting of three sections and featuring 36 "M" bars welded to steel rings and discharge gates remotely controlled by pneumatic positioners. The first two sections are driven by a 150-hp motor and the third section by a 75-hp motor. The motors are connected to the drums through fluid couplings, belt systems and reduction gears to achieve a drum speed of 6 rpm.

The logs are discharged from the barking drums to a four-chain conveyor which passes them to a set of spiked speed rolls which have



E. M. Leavitt
Vice Pres. & Res. Mgr.

IT'S BAUER PRESSAFINERS 35 to 5

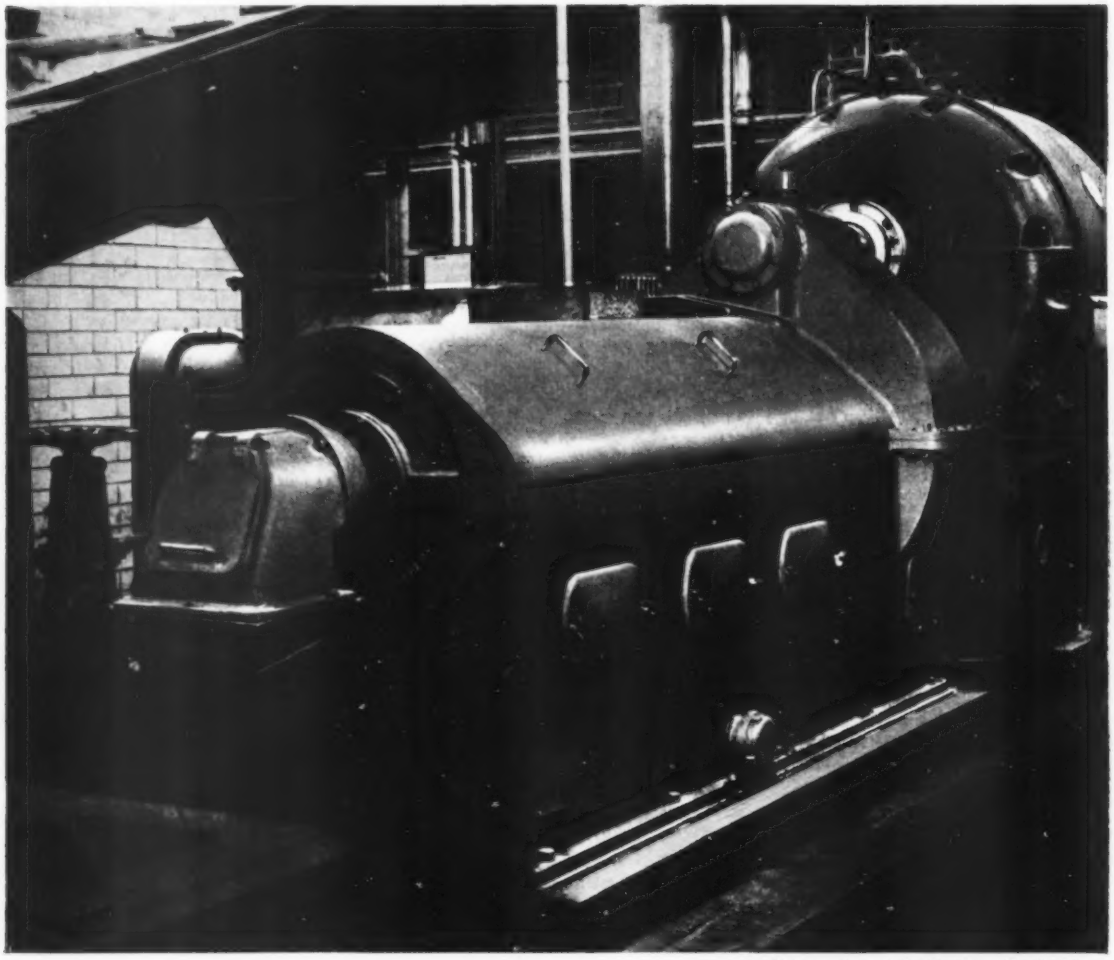


Photo courtesy of Olin Mathieson Chemical Corp.

Tops in *Performance, Dependability . . . and SALES!*

To judge the acceptance of a product, look at its sales record.

Take Pressafiners, for instance. In the 3 year period since the Bauer-designed, Bauer-built Pressafiner was introduced, over 35 of the units have been put into operation in pulp mills. This includes several of the new, big No. 581 units for pulp washing systems. During the same period only a few other screw presses have been sold.

Facts are facts. Repeat orders and the over-all sales picture tell the story. Industry only accepts the best in performance, the best in dependability. That's why, when it comes to chip pressing or pulp washing, the Pressafiner gets the call.

Your inquiry will receive prompt, personal service.

TO UP-GRADE PRODUCTION CALL BAUER

THE BAUER BROS. CO. Springfield, Ohio

IN CANADA: THE BAUER BROS. CO. (CANADA) LTD., Brantford, Ontario

Digesters • Pressafiners • Double and Single Revolving Disc Refiners • Centri-Cleaners
Pump-Through Refiners • Complete High Yield "Bauerite" Systems

For more data circle 110 on Post Card

the effect of straightening the logs for proper transfer to the 5½-ft. wide by 25½-ft. long, 90 fpm sorting belt via a short transfer deck made up of seven parallel chains. Logs are discharged from the sorting belt to the 2 ft. wide, 23½ ft.-long, 350-fpm chipper feed belt.

The Murco 104-in. dia., 12-knife chipper, driven by a 1250-hp synchronous motor, is equipped with a 24-in. V-spout, brake, blower housing, and Uni-Chip knife mounting. It has a chipping capacity of 70 to 85 cords per hour. The back of the disc has fan blades that blow the chips through a top discharge to a blow line and into an elevated 16-ft.-dia. by 25-ft. high surge bin. The surge bin is equipped with a 14½-ft. dia. rotating table discharger which delivers the chips into a rotary pocket feeder supplying the pneumatic chip conveying system. The pneumatic conveying system is equipped with a 450-hp blower which blows the chips to any of the three outside storage areas or to either of two chip storage bins. The outside chip storage area has a combined capacity of 18,000 cords of chips.

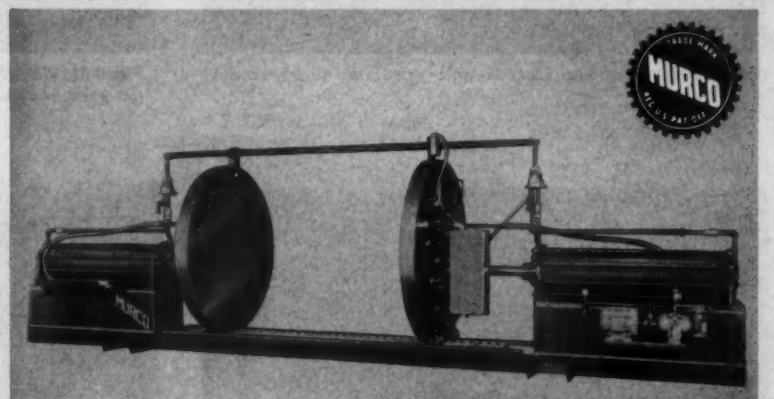
The chip handling system in the outside storage area consists of three reclaiming pits equipped with conveyors and rotary pocket feeders and a pneumatic conveying system including a 450-hp blower which delivers chips to either of two 40-ft. dia. storage bins. One of the storage bins is used for pine chips and the other for hardwood chip storage. The bins are equipped with 17-ft. dia. turntables rotating at 6 rpm and discharging chips to a 3½-ft. wide belt conveyor which supplies a tripper conveyor located over the digesters. The belt conveyor is equipped with a Type "SV" Weightometer designed to weigh a maximum of 32,000 cu. ft. of chips per hour. The weightometer is provided with a master weight totalizer and a remote totalizer, the latter is mounted in the control room. A loading-out counter controls the quantity of chips delivered to the digesters according to pre-set tonnage requirements. A pneumatic transmitter is attached to the weightometer beam which provides a 3-15 psi output signal fed directly to a chart recorder.

Digesters

Liquor is metered into the four 6,100-cu.-ft. digesters by indicating and integrating meters that automatically stop the pumps and close the liquor valves when the preset volume has been delivered. Steaming and relieving of digesters is done by completely automatic controls, with charts recording steam flow, relief flow, digester pressure and temperature at two points in the digester. The digester relief goes through an entrainment separator to a turpentine condenser. The latter is a Type III, 500-sq.-ft. surface heat exchanger fabricated of Type 304 stainless steel. It is designed for a pressure of 65 psi and features uniform vapor flow in the condensing passage with low pressure drop.

Each of the four digesters is blown through a 10-in. seatless-type blow valve equipped with a TN5Y motor operator and automatic lubrication system. The operating motors, connected to the valves through reduction gears, are controlled from a push button station on the digester operating floor.

There are two blow tanks — a pine blow tank of 24,000 cu. ft. capacity and a hardwood blow tank of 17,500 cu. ft. capacity. Both are equipped with bottom entry, vertical, three-blade sweep type agita-



If YOU SHIP PAPER IN ROLLS.....

MURCO Roll Heading Machines

Here is a machine that will operate efficiently and continuously day-in-and-day-out without any attention that is so common with roll heading machines of lighter construction. The pioneer Roll Heading Machine in the industry, MURCO Roll Heading Machines are made in various sizes — 24" to 72" diameter and lengths varying up to 200". Installations in mills throughout the country.

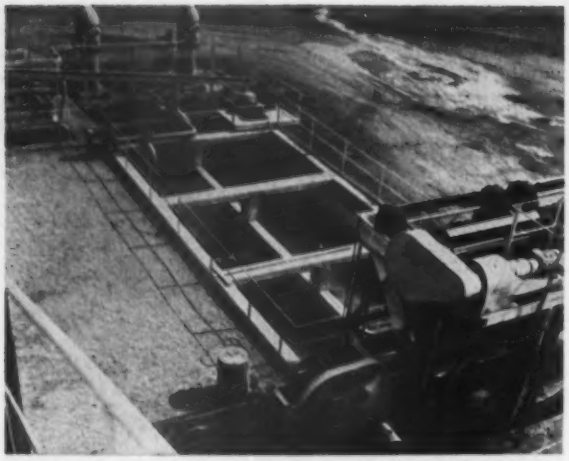
If you ship paper in rolls, just tell us the size of your rolls and your present method of heading rolls . . . we will submit a proposal to meet your requirements . . . without obligation.

- WILL CUT FINISHING ROOM COSTS
- PRODUCE NEATER ROLLS
- IMPROVE ROLL APPEARANCE

- Valve may be operated from any position
- Rollers of solid aluminum or wood
- Heavy frame construction that requires no maintenance

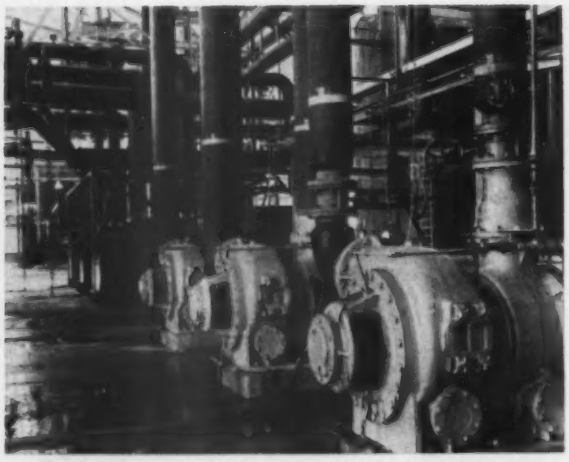
D. J. MURRAY MANUFACTURING CO.
MANUFACTURERS SINCE 1883 • WAUSAU, WISCONSIN

For more data circle 111 on Post Card

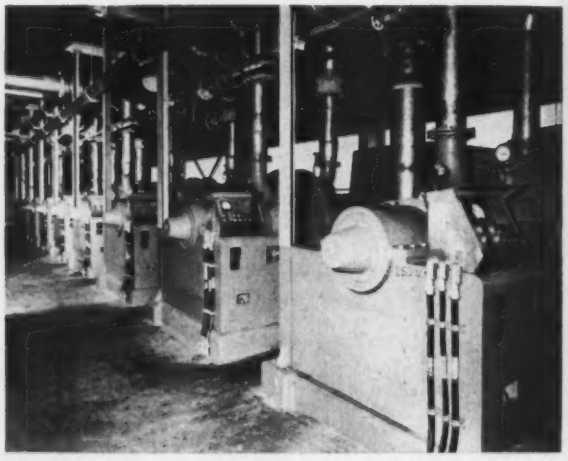


Link Belt revolving screens and grit and bark removal system.

Fibre-Making Processes barking drums and (right) chipper area housing Murco chipper.



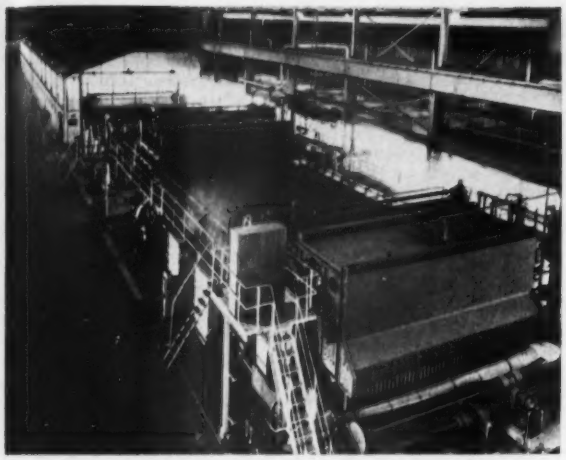
Black-Clawson breaker traps (foreground) and Bauer Bros. Pump-Through refiners used as ticklers.



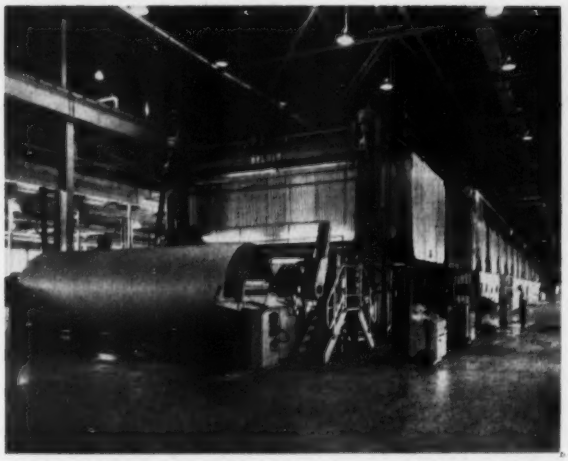
Bauer Bros. Pump-Through refiners driven by 700-hp turbine used on stock refining.

Black-Clawson selectifier screens ahead of the paper machine.

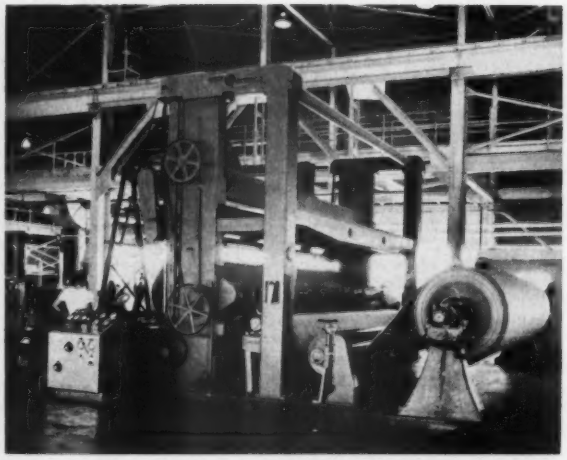
Five Nash H-5308A vacuum pumps provide the vacuum system.



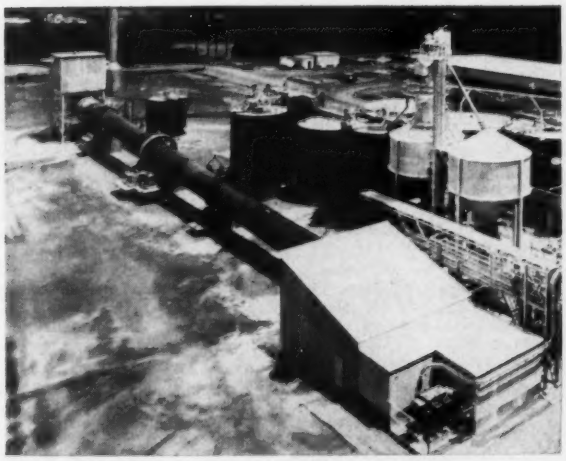
Beloit fourdrinier with two pressure headboxes.



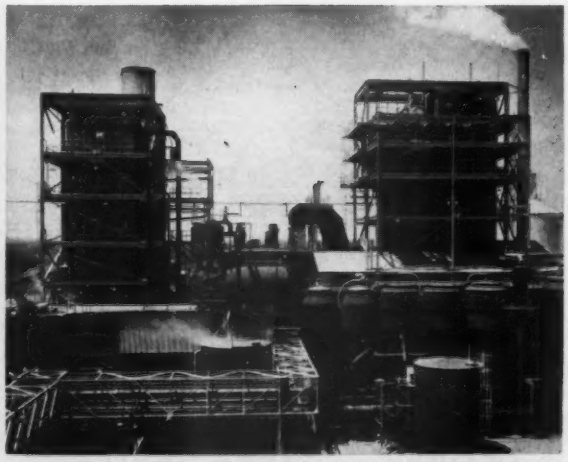
Dry end of Beloit machine with dryers enclosed with Ross hood.



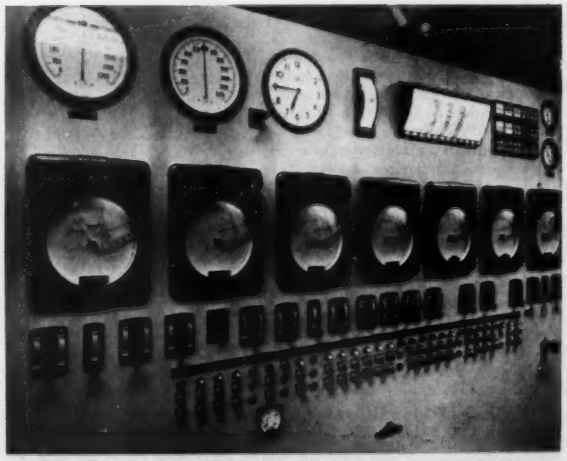
Beloit two-drum, 24-in. dia. winder with shear cut slitters.



Smidth 9-ft.-dia. kiln and Dorrco causticizing system.



Chicago Bridge sextuple effect evaporator and Combustion Engineering recovery furnace and power boiler.



Bailey Meter combination boiler control panel housing combustion control, 3-element feed water control, etc.

Principal equipment installed at Tennessee River Pulp and Paper Co. mill

Wood preparation

Barking drums (2), 12-ft-dia. by 67½-ft-long, 3-section type with 36 "M" bars .... Fibre Making Processes Inc.
Chipper, 104-in.-dia., 12-knife, equipped with 24-in. V-Spout, brake, Uni-Chip knife mounting, etc., driven by 1250-hp synchronous motor ..... D. J. Murray Mfg. Co.
Chip storage bin (2), 40-ft.-dia., equipped with 17-ft.-dia. turntables ..... Chain Belt Co.
Flume water circulating pumps (2), Peerless 24 MF Hydro-Foil, vertical, 12,000 gpm ..... Food Machinery & Chemical Corp. Hydrodynamics Division
Pneumatic chip conveying system (2), with 450-hp blowers ..... Rader Pneumatic Inc.
Screens (2) revolving disc type, 10-ft. 7-in. dia., equipped with spray systems for bark and flume debris screening ..... Link Belt Co.
Weightometer, Type "SV" with master weight totalizer ..... Merrick Scale Mfg. Co.
Wood rake, Lorain, rail mounted ..... Thew Shovel Co.

Digesters

Blow valves (4), 10-in. seatless type, with TN5Y motor operators and automatic lubrication system ..... Yarnall-Waring Co.
Digesters (4), 6,100-cu.-ft. capacity each with Rovang capping valves ..... Wyatt Metal & Boiler Works
Digester control systems, including automatic steaming and relief control and automatic liquor measuring ..... Foxboro Co.
Tripper conveyors ..... Chain Belt Co.
Turpentine condenser, Type III, stainless steel, 500 sq. ft. surface heat exchanger, designed for a pressure of 65 psi ..... Rosenblad Corp.

Pulp refining, screening and washing

Breaker traps ..... Black-Clawson Co.
Consistency control system ..... DeZurik Corp.
Instruments and controls ..... Foxboro Co.
Refiners (2), No 440 Pump-Through type ..... Bauer Bros. Co.
Screens (3), hot stock screens ..... Improved Machinery Co.
Washers (6), 11½-ft.-dia. by 16-ft.-long .... Improved Machinery Co.

Black liquor evaporation and chemical recovery

Black liquor combustion control with oxygen analyzer and 3-element feed water control ..... Bailey Meter Co.
Electrostatic precipitator, wet-bottom, double-chamber units consisting of two fields each, timer controlled pneumatic rappers, 125,000 CFM capacity ..... Koppers Co. Inc.
Evaporators, sextuple effect evaporators, 324,000 lbs/hr capacity, with patented preheater in each effect ..... Chicago Bridge & Iron Co.
Instruments and control systems ..... Foxboro Co.
Recovery furnace, two-drum boiler, 183,000 lbs/hr steam generating capacity, equipped with 10 spray nozzles, decanting hearth, tangential air supply, superheater, vertical economizer and cascade evaporator ..... Combusting Engineering Inc.
Recovery process controls, black liquor flow control, etc. ..... Bailey Meter Co.
Salt cake and lime handling system ..... Fuller Co.
Soot blower system, 14 single-sided, motor-driven Model IK-300 retractable, with Selectromatic control panel ..... Diamond Power Specialty Corp.

Causticizing and lime recovery

Density gauges, LASR series ..... Ohmart Corp.
Dorrco causticizing system ..... Dorr-Oliver Inc.
Hot lime drag conveyor, 10 tons/hr capacity, for reburned lime handling ..... Link Belt Co.
Instruments and control system ..... Foxboro Co.
Kiln, 9-ft.-dia. by 250-ft.-long, with chain system and Peebody gas scrubber equipped with extra sprays; driven by 60-hp, 4-speed squirrel cage motor ..... F. L. Smidth & Co.
Lime mud filter, Oliver, 6-ft.-long 8-ft.-dia. vacuum filter equipped with rubber grid deck ..... Dorr-Oliver Inc.
Screw Conveyors (3), 11½ in. dia. ..... Link Belt Co.

Stock preparation

Consistency regulators, pipeline type ..... DeZurik Corp.
Double dilution system in stock consistency control ..... DeZurik Corp.
Dilution control valve ..... DeZurik Corp.
Refiners (9), pressure type, single 44-in.-dia. disc; two used as ticklers are driven by 700-hp synchronous motors; 7 are driven by 700-hp turbines on stock refining ..... Bauer Bros. Co.

Paper making

Air compressors (3), 800 CFM capacity each ..... Ingersoll-Rand Co.
Air system and paper machine hood ..... J. O. Ross Engineering Co.
Basis weight control system, automatic, AccuRay system ..... Industrial Nucleonics Corp.
Breaker traps ..... Black-Clawson Co.
Broke pulper, Pulp Master ..... E. D. Jones Corp.
Calender stacks (2), with 40-in.-dia. bottom roll and 7-in.-dia. calender rolls each ..... Beloit Iron Works
Compressors (3), two L-3 and one L-35, serving paper machine headboxes ..... Nash Engineering Works
Cranes (3), overhead traveling, of 25-ton, 56-ton and 30-ton capacity ..... Northern Engineering Works
Dryers (74), 60-in.-dia., designed for operation at 160 psi pressure ..... Beloit Iron Works
Fourdrinier, equipped with 262-in.-wide wire, primary and secondary headboxes, 54-in.-dia. couch, 8 suction boxes, etc. ..... Beloit Iron Works
Helper drives ..... Reliance Electric Co.
Lift trucks (5), 40,000 lbs., 12,000 lbs., 10,000 lbs. and two 7,000 lbs. capacity ..... Hyster Co.
Moisture control and dryer steam supply system, automatic ..... Stamm Drying Controls Inc.
Paper roll lowerer, operating at 75 fpm ..... Link Belt Co.
Press section, consisting of 1st suction press, second press, and a smoothing press ..... Beloit Iron Works
Save-all, 11½-ft.-dia. by 16-ft., vacuum filter ..... Improved Machinery Co.
Selectifier screens ..... Black-Clawson Co.
Steam turbine, 2,300-hp, prime mover of paper machine ..... General Electric Co.
Starch handling system ..... Corn Products Sales Corp.
Vacuum pumps, five H-5308A conical vacuum pumps on couch and suction boxes; one H-9 on Oliver filter; a K-5308A on felt conditioner; and an L-3 Hytor on dryer drainage system ..... Nash Engineering Co.
Winder, motor-driven, two-drum design of 24-in.-dia. each, with shear cut slitters ..... Beloit Iron Works

Power plant and water system

Boiler feed water pumps ..... Ingersoll-Rand Co.
Boiler feed water treatment plant ..... Cochrane Corp.
Combustion control and 3-element feed water control system ..... Bailey Meter Co.
Deaerator ..... Graver Water Conditioning Co.
Fire pumps (2), Peerless Model 6 in. AF15, 1,500-gpm. horizontal split case, double suction ..... Food Machinery & Chemical Corp. Hydrodynamics Division
Power boiler, 300,000 lbs/hr steam generating capacity, two-drum baffleless type, equipped with continuous discharge spreader stoker, superheater, tubular flue gas air heater, dust collector, cinder recovery system ..... Combustion Engineering Inc.
Sootblowers, two electric motor-driven Model IK-300 sootblower units ..... Diamond Power Specialty Corp.
Traveling screen ..... Chain Belt Co.
Unit substations and electrical power distribution system ..... Westinghouse Electric Co.

General

Knife and shear blade grinder, Model AK, traveling wheel type, 170-in. capacity with hydraulic wheel carriage, adjustable cushioning valves ..... Hanchett Mfg. Co.
Motors, electric ..... General Electric Co., Westinghouse Electric Co.
Pumps ..... Allis-Chalmers Mfg. Co. Gould Pumps, Worthington Corp.
Refractories ..... Harbison Walker
Roll grinder, 43 in/60 in. by 316 in., two-wheel, swing rest type ..... Farrel-Birmingham Co. Inc.
Slitter grinder, Model SK-24, with grinding wheel mounted on a precision spindle and oscillating automatically by cam action ..... Hanchett Mfg. Co.
Tanks ..... Hammond Iron Works
Valves ..... Jamesbury Corp., O. I. C.

tors. The load on the agitators automatically regulates pulp consistency in the blow tank.

Pulp refining, screening and washing

Pine stock is pumped by a hydraulically controlled variable speed coupled pump through a breaker trap, with pressure on the discharge side of the breaker trap regulating the pump speed. From the breaker trap, stock passes through two lines of refining and washing, each consisting of two No. 440 Pump-Through refiners in series, a hot stock screen and three vacuum washers each 11½ ft. dia. and 16 ft. long. A third screen serves as a spare for either line of stock refining and washing.

Both lines of washers discharge into a common screw conveying system which conveys the washed stock to the 120-ton capacity pine high-density storage tank equipped with mining nozzles and agitators. Rejects from the screens are passed to a common reject surge tank and are returned to the blow tank for re-refining.

Hardwood stock is pumped in similar fashion through the breaker trap and then directly to the hot stock screen and the three-stage washer system. Washed stock is then conveyed by a screw conveyor to the 60-ton capacity hardwood high-density storage tank with cone bottom and blow tank type agitator and consistency control system.

All operations from the chip storage bins to the high-density storage tanks are remotely controlled from a central control room.

Black liquor evaporation and chemical recovery

The weak black liquor leaving the washers is filtered in a precoat filter and pumped to a weak liquor storage tank. From here it is pumped to a sextuple-effect evaporator system equipped with stainless steel mesh pad entrainment eliminators installed in larger than normal diameter domes.

The evaporators concentrate liquor from 13.5 per cent to 50 per cent total solids content at an evaporation rate of 324,000 lbs/hr and an evaporation economy of 5.41 lbs.

HANCHETT TRAVELLING WHEEL TYPE KNIFE GRINDER

MODEL AK AUTOMATIC

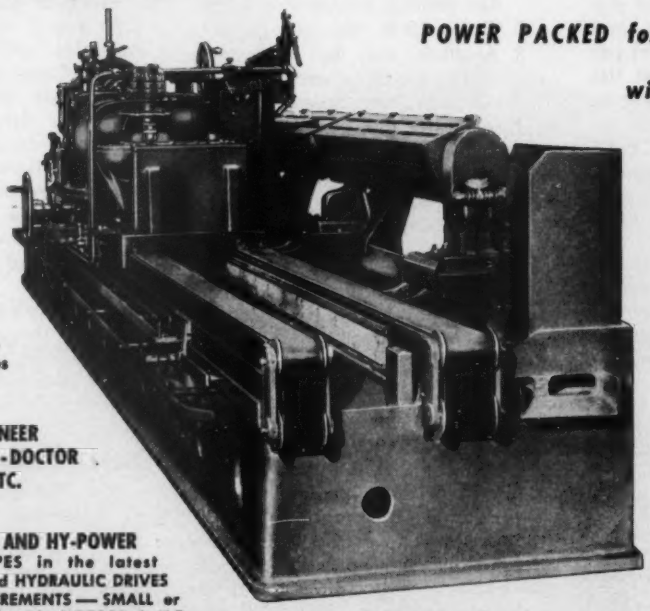
EXTRA HEAVY DUTY

SPECIFICATIONS

Capacity—84" to 396" lengths; Motors — 7½ to 40 H.P., Balanced; Drives — Mechanical - Hydraulic; Speeds—10' to 150 ft. per min.; Wheels—16"-20"-24" Dia.; Types — Cylinder - Segmental; Bearings — 100% Ball and Roller Types

FOR CHIPPER-HOG-PAPER-VENEER KNIVES-ROTARY CUTTERS-DOCTOR BLADES-SHEAR BLADES-ETC.

OTHER MODELS - DN - GK AND HY-POWER TRAVELLING TABLE TYPES in the latest MECHANICAL-ELECTRIC and HYDRAULIC DRIVES to meet ALL KNIFE REQUIREMENTS — SMALL or LARGE from 32" to 240" with MOTORS 3 H.P. up to 75 H.P.



Built by Master Craftsmen

POWER PACKED for HIGH PRODUCTION with PRECISION ACCURACY

SMOOTH RUNNING
QUIET
VIBRATIONLESS

WE GUARANTEE

1 — More and Better Knives for Less
2 — Finer Finishes with Greater Accuracy
3 — Cleaner Cut Material
4 — Reduced Knife Costs
5 — Longer Knife Life with Less Changes

Send Us Your Knife Problems

HANCHETT MANUFACTURING COMPANY

Main Plant BIG RAPIDS, MICH.
West Coast PORTLAND (1) OREGON

For more data circle 112 on Post Card

tion efficiency is achieved through use of the patented integral preheater which raises the liquor temperature as it passes from one effect to another. Corrosion in critical areas is kept under control by stainless steel tubes and stainless Hortonclad shells, heads and tube sheets.

Liquor from the evaporators goes to the wet-bottom electrostatic precipitator and is further evaporated in a twin-wheel cascade evaporator before it enters the recovery furnace at 68-70 per cent total solids content. The electrostatic precipitator is designed to handle 125,000 CFM of gases and remove 97.5 per cent of the solids or approximately 29 tons of entrained sodium sulfate per day. It is a double-chamber unit, each chamber consisting of two fields containing ducts and 24-ft.-high, flat steel collecting electrodes. Ductwork, slide gates, and electrical equipment are so arranged that one chamber may be closed off and opened for service and maintenance while the other chamber remains in operation carrying a full gas load at reduced efficiency. The precipitator also features timer-controlled pneumatic rappers with provision for simultaneous rapping of the collecting electrodes in one field of a chamber at a time, to minimize possibility of re-entrainment of dust during the rapping period.

The chemical recovery unit is designed to burn 1,250,000 lbs. of dry black-liquor solids per day and to generate 183,000 lbs. of steam per hour at 600 psi and 750° F, at the superheater outlet. Liquor flow to the 10 spray nozzles is measured by a magnetic flow meter and controlled by a hydraulically coupled variable speed pump. The recovery unit incorporates such features as decanting hearth, tangential air, panel screen and superheater, two-drum boiler, vertical economizer and cascade evaporators. Its starting burners incorporate automatic features that afford a high degree of protection and safety. The main burner is maintained by an automatic spark-ignited pilot burner monitored by a differential pressure unit which will permit fuel flow through the burner only when the pilot burner is operating.

Soot is blown by means of 14 single-sided, electric motor-driven (Model IK-300), retractable soot blowers. Steam from the superheater outlet header, which is used as a blowing medium, is admitted through the blower by a mechanically operated poppet-type valve featuring adjustable pressure control. All blowing is controlled from a Selectromatic control panel, permitting the operator to select or bypass any unit for efficient boiler cleaning. The Selectromatic Panel performs the functions of (1) permitting automatic operation of the selected blower units in sequence, (2) indicating normal operation, and (3) providing adequate alarm for the protection of the sootblower units.

The controls for the furnace and evaporator are mounted adjacent to each other. Combustion of black liquor is automatically regulated by (1) black liquor-total air ratio control; (2) black liquor-primary air ratio control; (3) secondary air control; and (4) furnace draft control. An oxygen analyzer is used as a guide to proper combustion conditions immaterial of whether black liquor, gas or oil are used as fuel. An additional feature is the three-element feed water control system.

Recovery process controls include (1) primary and secondary black liquor line heater control; (2) cascade evaporator level and density controls; (3) black liquor flow control; and (4) various storage tank level controls.

Causticizing and lime recovery

The Dorrco causticizing system used at the mill consists of:

1. A lime slaker with a 10-ft.-dia. slaking compartment.
2. Three 12-ft. dia. causticizers.
3. A 30-ft. dia. by 24-ft. deep white liquor clarifier (four-compartment, balanced type).
4. A 30-ft. dia. by 24-ft. deep, four-compartment, two-stage lime mud washer.
5. A 20-ft. dia. by 20-ft. deep paddle agitator for lime mud storage.
6. A 35-ft. dia. by 24-ft. deep green liquor clarifier modified for future conversion to a two-compartment tray thickener.
7. A 7-ft. dia. dregs mixer.
8. A 24-ft. dia. by 25-ft. deep dregs washer.

Lime mud is filtered by an Oliver 6-ft. long by 8-ft. dia. vacuum filter equipped with rubber grid deck. The filter is operating on a 360° vacuum cycle to provide the equivalent of precoat operation without the addition of any filter aid. It has a daily capacity of 250 tons $CaCO_3$ discharging at 75 per cent solids with an alkali content of approximately 0.5 per cent. The precoat is maintained at a thickness of about ¾ in.

A screw conveyor conveys the cake from the filter into a 9-ft.-dia. by 250-ft.-long kiln carried on four tire and roller supports and equipped with chain system to assist in more efficient heat transfer from the gases to the lime mud and minimize formation of mud rings. The kiln is driven by a 60-hp, 4-speed, squirrel-cage motor through a master gear and pinion, the latter being two anti-friction bearings connected through a flexible coupling to a speed reducer.

Kiln gases are cleaned in a gas scrubber specially designed with an enlarged humidifying section with extra sprays to pre-scrub the gases. The kiln is fired by a combination gas and oil burner. Reburned lime is handled by a 10-ton/hr. lime drag conveyor and three 11½-in.-dia. screw conveyors.

Stock preparation

Stock from the high-density storage tanks is pumped to 10-ton-capacity leveling chests of tile construction and equipped with propeller type agitators. From here it is pumped through pipeline consistency regulators making use of the double dilution system with mining nozzle, low pressure dilution nozzle and dilution control valve to keep the outgoing consistency of stock from the high-density tank within the range of the control valve on the consistency regulator.

Stock is pumped at a regulated consistency of about 4 per cent to nine No. 440 Pump-Through refiners. These are pressure-type refiners with single 44-in. dia. discs. Two are driven by 700-hp synchronous motors and are used as ticklers. The other seven are driven through reducers by 700-hp turbines and are used in various combinations to refine the stock to the primary and secondary machine chests.

From the machine chests, stock is pumped through the final consistency regulators, No. 440 tickler refiners, and magnetic flow meters to the suction of the respective fan pumps.

Paper machine

The fourdrinier, featuring a 262-in. wide wire, is equipped with both primary and secondary pressure headboxes, a 54-in. dia. suction couch roll, a 36-in. dia. dandy roll, eight 15-in. suction boxes, a 42-in. dia. lump breaker roll, a 38-in. dia. wire roll, three 18-in. and four 28-in. dia. wire return rolls, a 38-in. dia. breast roll, and 24-table rolls.

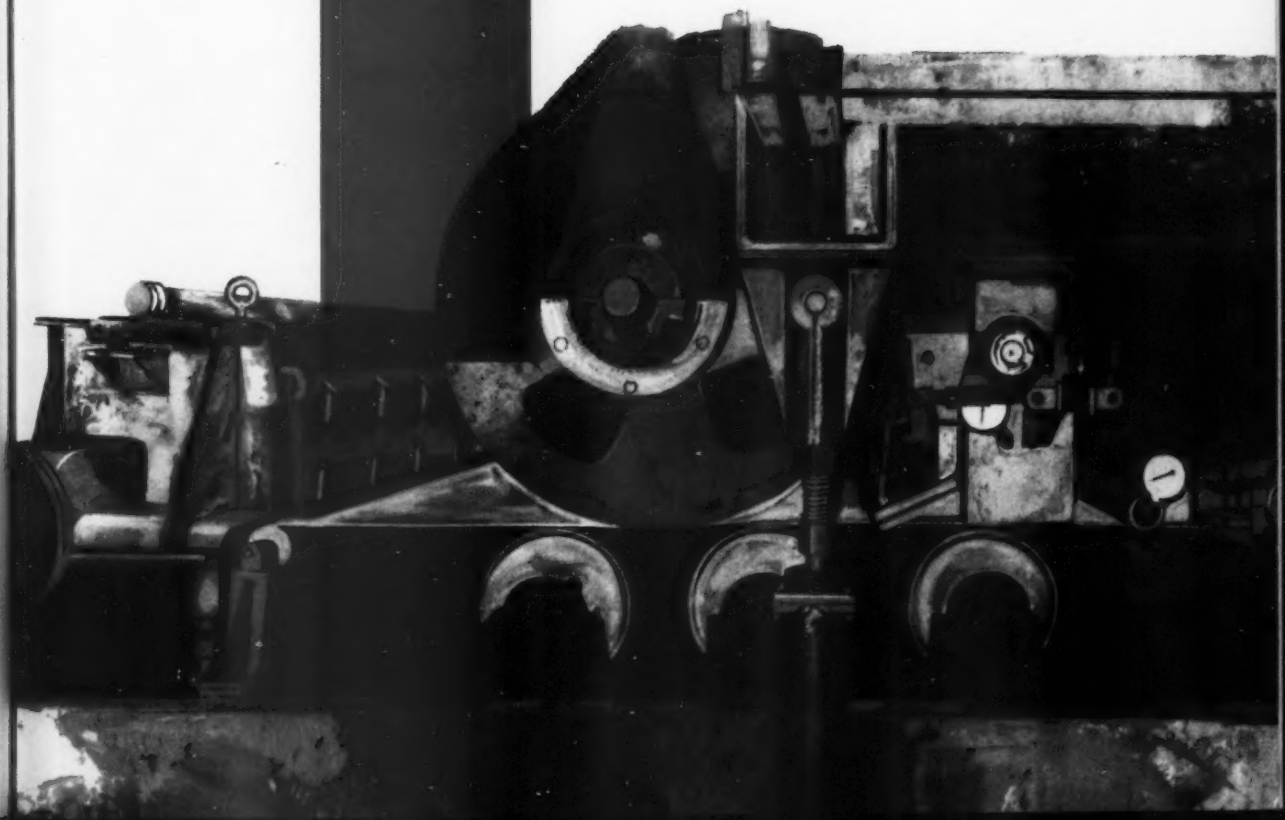
Continued on page 310

what dramatic
new developments
does the

INVERFORM

bring to
papermaking?

for answer, please turn page



INVERFORM*

offers new horizons to the paper industry

This new papermaking technique, embodying both Fourdrinier and cylinder machine principles, can be used in both paper and board manufacture. Inverform is a forming device which reorients fibers following their initial delivery to the wire and accomplishes water extraction in the two vertical planes. Inverform introduces the possibility of producing grades with new and improved characteristics at higher speeds than now possible, and offers the potential of new products now unknown to the industry.

- Paper grades that are made by Inverform have good formation and improved strength characteristics.
- Slower draining stocks can be run at higher speeds.
- Boards can be made with improved quality at higher speeds.
- Inverform assures excellent ply adhesion on multi-ply applications.

(BELOIT IRON WORKS builds Inverforms under license from ST. ANNE'S BOARD MILL CO. LTD.)

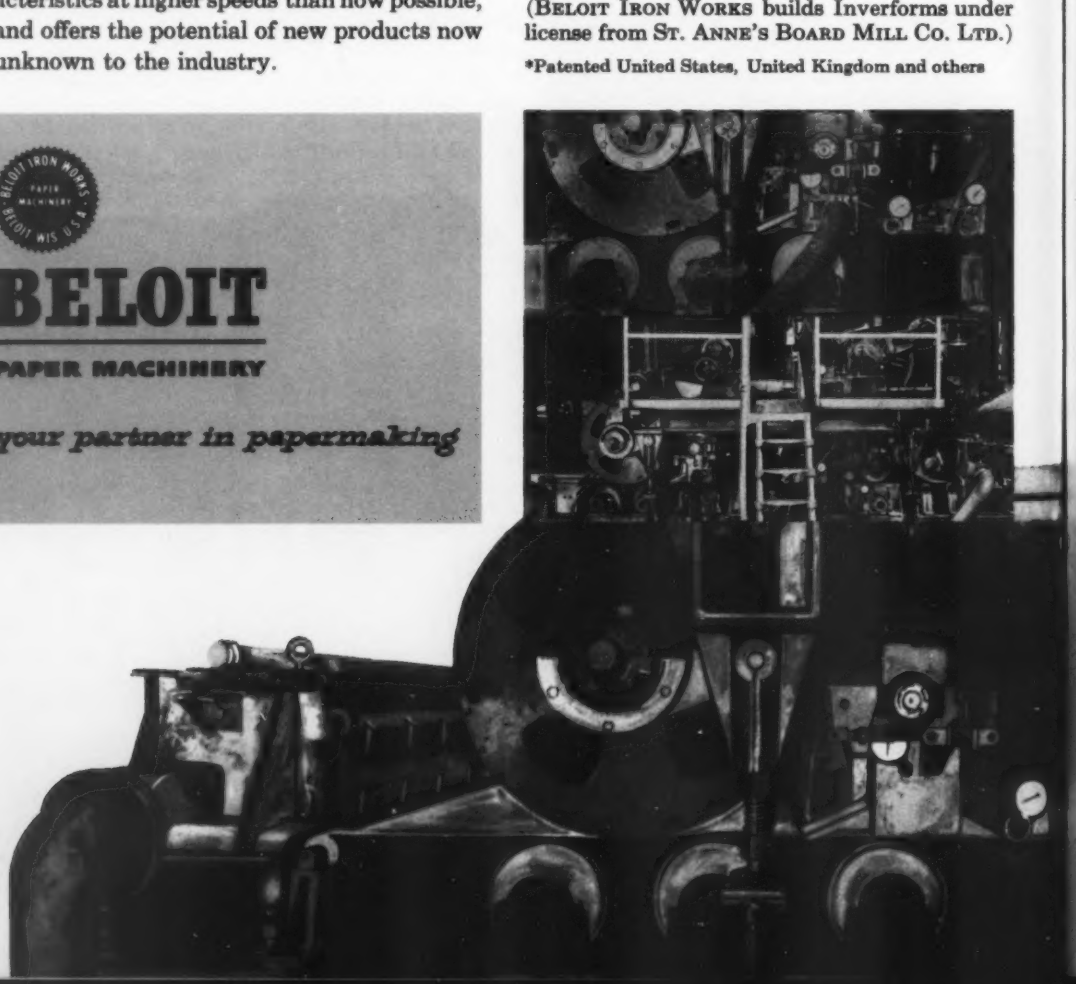
*Patented United States, United Kingdom and others

BELOIT IRON WORKS PAPER MACHINERY BELOIT WIS. U.S.A.

BELOIT

PAPER MACHINERY

your partner in papermaking



RHEOLOGY OF PAPER COATINGS

R. A. DIEHM
Professor of Paper Technology
Western Michigan University

Part VII – Behavior of coating mixtures on the coating machines

WHEN low total solids coating mixtures were used in off-machine coatings, the viscosities were relatively low and the flow qualities approached true Newtonian characteristics. Since high speed on-machine coating processes require high solids, coating mixtures which develop gellike structures upon standing came into use. Such structures can be rendered fluid (1) by the application of shearing forces, but the fluidity will remain only as long as the shearing forces are applied to the system. This type of system is usually called thixotropic.

While the complexity of the high solids system requires detailed rheological study, the importance of the rheological characteristics is not necessarily confined to high solids coating mixtures (1). The apparatus and techniques in making rheological studies do not simulate the action of the high speed machine, yet such measurements may be used to give an indication on how the coating mixtures will behave on the machine in actual practice.

An example of the high speed high solids coating would be the print type coater which applies a viscous coating film to the surface of the paper at speeds in excess of 1000 fpm. A coating for this purpose would be thixotropic so that it would be applied onto the paper in a smooth film that would set very rapidly. This is very much different from the requirements of a coater which applies the film to the paper from depressions of an engraved roll. A coating for this purpose would have to be much thinner and more fluid to make the transfer to the paper and to level into a smooth continuous film.

Properties of coating mixtures and their behavior in coating operations

It is commonly agreed that good coating mixtures are free of lumps, are of uniform composition, and have enough stability to withstand the high shear prevailing in many coating operations. Uniformity is a prime requisite for continued satisfactory coating application. Lumps would interfere with any and all coating processes. If there is to be control of the rheological properties, then the composition of the coating mixture must not show any appreciable variation. Stability became a factor with the advent of emulsion and dispersed adhesives. In the initial stages of this development, the breaking of emulsions and dispersions and coagulation due to acidic materials bled into the coating mixture from the paper were commonplace.

Some coating mixtures may show increased resistance to distortion under high shear in such a manner that it might be mistaken for dilatancy. This has been called "shear-rate thickening" or "shear-rate blockage" (2). Dilatancy is ruled out because there is no change in volume of the system when this resistance develops. Detailed studies of this phenomenon have not established a relationship between shear-rate thickening and acceleration of shear.

A further anomaly in coating mixtures has been described as "tachypyknosis" in which there is a tremendous reduction in shearing torque when the rate of shear is held constant. Evidences of shear-rate thickening and tackypyknosis have been reported (2) in coating clay suspensions. Shear-rate thickening is reached at a lower shear as some of the finer particles are removed from the coating clay.

One cannot consider the behavior of coating mixtures under high shear on the coating machines without taking a close look at the pigment particle size and its state of flocculation or deflocculation, as the case may be. The greater the degree of deflocculation, the lower will be the plastic viscosity under high shear, but this difference does not manifest itself under low rates of shear. The thixotropic nature of these coating mixtures was largely responsible for their tremendous resistance to shear. If such mixtures can be handled prior to the coating application, they will be operable while the more completely deflocculated pigments will make the coating mixtures inoperable because of too little thixotropy. Starch-clay coating mixtures in which the clay is deficient in the smaller particles show greater fluidity at low shear rates and do not have sufficient thixotropy to work properly on high shearing coating machines. This is corrected by the addition of soap.

Action of coating mixtures in the nip

Since the high shear occurs in the nips of roll coaters, it is necessary to study the action of the coating mixture in the nip. It has been reported (3) that the pressure developed in the nip is a function of the angular velocity and radii of the rolls, the distance between the rolls, and the viscosity of the liquid. It was calculated that in the nip of two rolls, each 1 ft in dia. separated 0.001 inch and running with a peripheral speed of 200 fpm., there

would be a decrease in pressure of 0.05 atmosphere with water in the nip. If the viscosity of the fluid in the nip were 20 centipoises, the decrease in pressure would be one atmosphere. Thus any speed in excess of 200 fpm. with a liquid having a viscosity greater than 20 centipoises will produce a vacuum sufficient to allow the formation of bubbles which can impart imperfections into the coating. Therefore, one might assume that if there is a reduction of the pressure on the discharge side of the nip, the coating will exhibit the surface in the form in which it is pulled from the rolls if it sets rapidly. If any subsequent leveling is to be done, it must do so after the pressure is returned to normal.

A coating mixture circulating in a horizontal nip (4) develops a downward vector from the roll motion with that portion nearest the roll faces moving towards the nip. Since the volume decreases as the nip is approached and since the coating mixture is incompressible, pressure must be developed. As it does, that portion of the coating mixture farthest from the roll faces must reverse itself and move outward from the nip. Directly below this area on a vertical line midway between the roll faces there is a point where the coating mixture is substantially stationary, and anything below this point moves through the nip.

It has also been observed (4) that as the coating mixture leaves the nips, it is drawn out into threads before rupturing when neither of the roll surfaces are absorptive. This necking of the coating mixture involves lateral flow of the materials before rupture occurs. As the stresses set up by lateral flow concentrate, the highest rate of shear is transferred from the face of the roll to the center of the film where rupture occurs. This is true of thixotropic coating mixtures.

When paper is present on one of the roll surfaces, its absorption of water will concentrate the coating mixture next to it with the result that the film will split near the other roll surface. When this occurs, surface patterns will be slight for thin films.

If the coating mixtures are Newtonian, there is no point of minimum viscosity so that the films may split anywhere, forming pronounced patterns. The sequence would reverse itself if the coating mixture were dilatant. Such a mixture would expand as the shear concentrated the pigment particles which would give a heavy pattern as the split would occur in the middle of the film.

The flow properties of the pigment (5) are extremely important in determining how the coating mixture behaves in the nip. This can be visualized best by considering the coating mixture a two-phase system in which the solid pigment is suspended in a liquid medium containing the adhesive. As this system enters the nip, the solid particles are suspended homogeneously throughout the liquid continuous phase. As soon as the coating mixture comes in contact with the paper, a sufficient amount of the liquid phase is removed by absorption, causing a non-homogeneous distribution of the pigment throughout the mixture as the pigment concentrates more and more as the surface of the paper is approached. This has a marked influence upon the mechanical action of the nip on both the paper and the coating mixture.

When one soft roll runs in contact with a hard roll, there is a continuous kneading action of the softer roll which develops a high shear within the coating mixture. If the coating mixture is thixotropic, it will split nearest the roll not faced with the paper because the region of highest shear will be in this region. As the coated paper leaves the nip, the low viscosity of the coating mixture at the point of split will result in a comparatively clean break with a minimum of pattern.

This will not be the case if the coating mixture exhibits dilatancy. Under high shear it might cause the rolls to chatter with its consequent disruption of the coating film. The expansion of the dilatant coating mixture under shear would form stalactites, resulting in a very rough coated surface.

When a film is split between two rolls running together in a nip, the ribbed rather than smooth surface is ever present. The ribs become more pronounced as the film becomes heavier. Rib formation is the result of lateral flow (6) of the coating mixture along the faces of the rolls prior to rupture of the film. In addition to the film thickness, the surface tension of the coating mixture, the speed of the rolls, and the diameter of the rolls influence rib formation.

Water release or water retention, as the case may be, of the coating mixture play important roles in its behavior on coating machinery. It has been established (7) that dewatering of the coating mixture in the nip may promote smoother coating surfaces by reducing the tendency of the film to split as it leaves the nip due in part at least to its semifluid condition. Thus greatly reduced patterning is obtained by using lighter applicator roll pressures following heavier meter roll pressures. It follows that, if the pressure of the applicator nip is low enough, under fast dewatering, the coating will assume the properties of a filter cake and will be released more cleanly from the roll not faced with paper than under conditions where higher pressures exist. There is no distinct zone of high shear and low viscosity in the usual sense. One might conclude from these observations that it is not always best to promote a too fluid condition in the coating film as it leaves the nip.

When the water retention of the coating mixture is very high, the amount of coating mixture left on the applicator roll will be about the same as that carried away on the surface of the paper (6). This promotes patterning of the coated surface. Patterning on the roll coater can be reduced when the coating film can be split very near to the applicator roll.

Water retention is equally important in the application of coatings with the air-knife coater. It will determine the thickness of the concentrated layer on the surface of the paper which cannot be moved by the air knife. It becomes obvious that this is a variable that can be manipulated to produce different effects with this type of coater.

Coating processes which make use of brushes or reverse smoothing rolls do well with coating mixtures with high water retention. Such smoothing devices will smear and distort the surface of the coating if it gives up water rapidly enough so as to set before the smoothing operation can be accomplished.

At this point it might be well to group the coating processes according to the rheological nature of the coating mixtures employed by them. This has been done (5) in working with clay coatings, recognizing thixotropic and nonthixotropic coating mixtures. In doing so it was established that only those mixtures showing thixotropy are satisfactory for size press and roll coaters.

In the use of thixotropic coating mixtures part of the fluid phase is absorbed by the paper as an excess

Continued on page 310

HOW TO DETERMINE COMPARISON RATIOS

CHARLES C. MOFFATT

ACCOUNTING RECORDS can be analyzed and compared to give some valuable guides for better control and future planning for the success of the paper mill.

The success or failure of a business is not measured by a single ratio as some business men believe. A good relationship is needed on all of these ratios to determine the ultimate success or to locate any trouble areas that may be developing in the mill.

To calculate the various ratios for a business, you will need two accounting working papers to summarize past operations. They are:

1. Profit and Loss Statement
2. Balance Sheet

Current assets to current debt

For years this was considered the key ratio to measure success or failure. A business that has twice as many Current Assets as it has Current Debts is considered to be sound. However, it has been shown that this is just one of the many ratios that are needed to determine the true financial standing of a firm.

Calculate this ratio from your balance sheet figures. Divide the total of your Current Assets of $60,000 and Current Debts of $20,000 you would have a ratio of 3 to 1 — Assets to Debts.

Current Assets includes all cash, accounts receivable, notes receivable, prepaid items such as insurance, inventory, and Municipal State and Federal securities valued at the current market. Deduct any reserve you have established for bad debts from this total figure.

Current Debts represents the total of everything you owe that is due and payable within one year. Long term notes are not included and only the portion of other notes that are due within one year are included in this figure.

Acid test ratio

Most accountants make what they call the "acid test" to judge the liquid portion of a business. This is determined in the same way as the Current Assets to Current Debt ratio with one exception. In determining the amount of Current Assets eliminate the inventory figure and the prepaid items. Use all other asset figures previously listed except inventory and prepaid items.

The reason this is called the "acid" test is because by the elimination of inventory from your calculations, you have a picture of how you would stand if sales evaporated. Inventory would be changed into cash or accounts receivable when sales were made. The "acid" test is what would happen if sales did not materialize. Prepaid items cannot be converted into cash to pay Current Debts, so they are eliminated.

Net profits on net sales

This has long been considered another key ratio to use to measure the profitability of your business. But, with the increased emphasis on a higher rate of inventory and capital turnover, this ratio must be considered in light of the other ratios — particularly the net profit on the tangible net worth ratio.

To obtain this ratio divide your net profits by net sales. For instance, with net profits of $10,000 and net sales of $200,000 you have a five per cent profit on sales figure.

Net profits for this calculation are determined after taxes. Thus, the net profit before taxes in this illustration would be higher. Net Sales includes all sales less any returns, allowances and discounts shown on the profit and loss statement.

Net profits on tangible net worth

More and more financial advisers are looking closely at this figure to determine the true profitability of a business. This figure provides a clue to the amount of money available for the future growth and development of your business. It also indicates the amount of money you can safely withdraw or which can be distributed in dividends.

To calculate this percentage figure, use both your profit and loss statement and your balance sheet. From your balance sheet, subtract the total of all liabilities from the total of all assets. Next, deduct such intangibles as goodwill organization expenses, etc. The result is your Tangible Net Worth figure.

Divide the New Profits (after taxes) figure by the Tangible Net Worth. For instance, with net profits after taxes of $10,000 and tangible net worth of $100,000, you would have a relationship of ten per cent — profits are 10 per cent of net worth.

Net sales to tangible net worth

This ratio shows how rapidly your capital is turning over and is an indication of the efficient management of your investment in your business.

This ratio is obtained by dividing Net Sales by Tangible Net Worth. For instance, with Net Sales of $200,000 and Tangible Net Worth of $100,000, you would have a sales-to-worth ratio of 2 to 1.

If your capital is being turned over too slowly, there are some funds that are not working properly for you.

On the other hand, if the capital is being turned over too rapidly, your liabilities are apt to build up excessively as the amounts owed to creditors are substituted for permanent capital investment.

Current debt to tangible net worth

If your Current Debt is equal to or higher than your Tangible Net Worth, you are skating on thin ice creditwise. A quick check of this ratio will indicate what should be done to improve the situation in your business.

Calculate this ratio by dividing the Current Debt figure (all liabilities falling due within one year) by the Tangible Net Worth figure. For instance, with current debts of $20,000 and tangible net worth of $100,000 for a 20 per cent figure — debts are 20 per cent of worth.

Net sales to inventory

This figure is often referred to as Stock Turnover and can be used as a clue to show whether sales are

Continued on page 309

MINIATURE PULPWOOD PLANTATION — AFTER TWENTY YEARS

IRVING H. ISENBERG
Research Associate
Institute of Paper Chemistry

DATA on the survival and growth of a small pulpwood plantation during its first 15 years were presented in three previous articles in this journal [*The Paper Industry and Paper World*, May, 1945 (p. 220) and *The Paper Industry*, November, 1950 (p. 866), and February, 1956 (p. 1022)]. In April, 1940, a total of 400 transplants (50 trees each of eight species) were set out in 4 by 5-ft. spacing in the ravine to the rear of the research building of The Institute of Paper Chemistry at Appleton, Wis. Measurements on height, growth, and survival counts have been reported at five-year intervals.

In Table 1 is tabulated the percentage survival of the original 50 trees, the average height in feet and the tallest tree, the number of trees more than 4.5 ft. high, their average diameter at that height in inches, and the maximum diameter for all eight species at the completion of 20 years in plantation (total age, 23 years). In addition, the average height in feet and the average diameter breast high in inches is listed for the 10 tallest trees of each species. The total basal area is 46.2 sq. ft./A.

The height data at the end of the 1959 season are analyzed more thoroughly in Table II, which shows the distribution of trees in various arbitrary height classes.

It is also of interest to compare the height growth and survival of the original trees at five-year intervals. These data are presented in Table III.

After five years in plantation (total age, eight years), the survival was 76 per cent, the average height was 2.7 ft., and the tallest tree was 9.0 ft.

After 10 years in plantation (total age, 13 years), the survival was 70 per cent, the average height was 8.0 ft., and the tallest tree was 25 ft.

After 15 years in plantation (total age, 18 years), the survival was 57 per cent, the average height was 14.4 ft., and the tallest tree 39 ft.

After 20 years in plantation (total age, 23 years), the survival was 47 per cent, the average height was 20.9 ft., and the tallest tree 53 ft.

Also given in Table III are the average heights of the 10 tallest

TABLE 1—*Twenty-Year Growth Data on Plantation Trees*

Fifty Trees of Each Species Were Used in the Initial Planting

		Height, feet		Trees Taller than 4.5 Feet				Ten Tallest Trees	
					D.B.H., in.				
Species	Survival, %	Av.	Max.	No.	Av.	Max.	Basal Area, sq. ft.	Av. Height, ft.	Av. D.B.H., in.
Jack pine	32	23.5	40.0	16	3.00	5.1	0.868	28.1	3.59
Scotch pine	48	30.4	40.0	24	3.76	7.0	2.000	34.9	4.66
White pine	22	14.8	22.5	11	1.96	3.2	0.290	15.7	2.13
Red pine	20	10.9	17.0	10	1.13	1.9	0.085	10.9	1.13
White spruce	78	14.5	26.0	37	2.17	4.0	1.125	22.2	3.28
Norway spruce	88	17.5	32.0	44	2.21	4.3	1.410	27.1	3.54
Balsam fir	26	6.4	12.7	9	0.83	1.7	0.048	7.6	0.83*
European larch	62	36.6	53.0	31	4.19	7.9	3.419	45.0	6.01
TOTAL	47	20.9	53.0	182	2.67	7.9	9.245	23.9	3.15

* 9 trees only

TABLE II—*Distribution by Height Classes*

Height Class in Feet

Species	Below 4.5	4.5-9.9	10.0-19.9	20.0-29.9	30.0-39.9	Above 40.0	Total
Jack pine		1	3	8	3	1	16
Scotch pine				10	13	1	24
White pine		3	6	2			11
Red pine		5	5				10
White spruce	2	8	21	8			39
Norway		7	19	17	1		44
Balsam fir	4	7	2				13
European larch			2	4	10	15	31
TOTAL	6	31	58	49	27	17	188

TABLE III—*Survival and Height Growth at Five-Year Intervals*

Height in Feet

Species	Survival, %				Average Height				Av. Hght. 10 Tallest Trees				Maximum Hght.			
	5	10	15	20	5	10	15	20	5	10	15	20	5	10	15	20
Jack pine	82	78	46	32	5.3	12.4	17.9	23.5	7.3	17.0	23.3	28.1	9.0	20.5	32.1	40.0
Scotch pine	80	74	58	48	3.3	12.0	22.4	30.4	4.9	16.2	26.8	34.9	5.3	17.7	31.1	40.0
White pine	68	56	38	22	1.5	4.2	9.8	14.8	2.1	6.6	12.9	15.7	2.5	7.7	15.7	22.5
Red pine	50	40	34	20	1.5	3.9	6.8	10.9	1.9	4.8	8.8	10.9	2.8	6.1	12.4	17.0
White spruce	94	92	88	78	1.8	4.0	7.9	14.5	2.8	6.6	12.9	22.2	3.1	7.9	15.0	26.0
Norway spruce	94	92	88	88	1.9	5.1	11.2	17.5	2.8	7.4	16.2	27.1	3.6	9.3	21.5	32.0
Balsam fir	60	54	38	28	1.1	2.4	4.6	6.4	1.8	3.6	6.3	7.6	2.8	6.1	9.7	12.7
European larch	76	74	66	62	5.0	17.5	29.6	36.6	6.9	21.7	36.0	45.0	8.2	25.1	39.4	53.0
TOTAL	76	70	57	47	2.7	8.0	14.4	20.9	3.8	10.5	17.9	23.9	9.0	25.1	39.4	53.0

trees of each species at 5, 10, 15, and 20 years. These values are 3.8, 10.5, 17.9, and 23.9 ft., respectively.

As evident in the tables, some species have done much better than others. For example, the survival of the Norway spruce and the white spruce is very good. Principal causes of death and injury appear to have been excessive soil moisture for red and white pines, sun scald for balsam fir, and suffocation by carelessly spilled fuel oil for jack and Scotch pines. Other contributing factors have been weed competition, volunteer tree and shrub competition, crowding, winter drouth, rabbits, mice, larch sawfly, pine needle rust, resin gnat, white grubs, snow and ice, and theft.

Growthwise, the European larch trees have done the best by far. Scotch pine is next best in both height and diameter. Of the native species, jack pine is the leader.

It is planned to continue these measurements at five-year intervals.

COMPARISON RATIOS

Continued from page 307

lost because your stock is too skimpy or whether your inventory is top-heavy, obsolete or stagnant.

Calculate this ratio by dividing annual Net Sales by Inventory figure on your balance sheet. The result is a ratio of stock to sales and can be compared with previous year's operations to determine any improvement or decline in operations.

For instance, with net sales of $200,000 and an inventory figure of $50,000, you would have a stock turnover rate of 4. A more accurate figure is obtained by taking the book inventory of each month, dividing by the number of monthly figures used, and dividing this average inventory into your annual net sales. This eliminates any peaks and valleys that may not be revealed in the year-end inventory figure shown on your balance sheet.

Collection period

Calculate this figure by dividing your annual credit sales (total sales less cash sales) by 360 days. This gives a figure representing your average daily credit sales. This figure is then divided into the total of accounts and notes receivable.

For instance, with credit sales of $180,000 divided by 360 days gives an average daily credit sales figure of $500. If the total receivables shown on your balance sheet is $15,000, the collection period is 30 days — $500 divided into $15,000.

After having determined this ratio, you will know whether or not you should increase your efforts toward collections or change the credit terms. As a general rule, this figure should not be more than 10 days longer than your net selling terms. For instance, with terms of "net 30" the figure should not be more than 40.

Net profits on net working capital

Your Working Capital represents the margin that is available for carrying inventories and accounts receivables and for financing normal operations. Determine the amount of your Net Working Capital by subtracting all Current Debts from Current Assets.

Calculate the ratio of Net Profits to Net Working Capital by dividing net profits (after taxes) by net working capital. For instance, with net profits (after taxes) of $10,000 divided by net working capital of $40,000 you have a figure of 25 per cent which represents a higher-than-average figure.

Net sales to net working capital

Obtain this ratio by dividing Net Sales by Net Working Capital. For instance, using the figures that have been used for illustrative purposes here, you would have a net sales figure of $200,000 divided by net working capital figure of $40,000 for a ratio of 5 to 1 of sales to working capital.

The higher this ratio figure, the more dependent is your business on credit granted by suppliers and the bank. With more money available for current operating funds, you will lower this ratio figure and gain more independence in the financial aspects of your business.

Comparison

Having calculated the ratios outlined above, you will have a better picture of your business — you will be seeing your business through the eyes of a financial adviser or an accountant.

These ratios, by themselves, are not the complete answer to more successful management of your business. You need to compare them with your figures for the past year and with ratios of other firms.

Here are some important ratios developed by Dun and Bradstreet from other firms:

Current Assets to Current Debt
2.7 to 1
Net Profits to Net Sales
6.36 per cent
Net Profits on Tangible Net Worth
8.45 per cent
Net Sales to Tangible Net Worth
1.5 to 1
Current Debt to Tangible Net Worth
18.4 per cent
Net Sales to Inventory (turnover)
6.8 turns
Collection Period
10 days plus net terms
Net Profits on Net Working Capital
26.2 per cent
Net Sales on Net Working Capital
4.96 per cent

TENNESSEE RIVER PULP & PAPER CO.

Continued from page 301

per lb. of steam used. This evapora-Wire and table rolls are fiberglass-covered.

The press section consists of a first suction press, a second suction press, and a smoothing press. Suction rolls are rubber-covered and 44 in. in dia. Top press rolls are rubber-covered and 38 in. in dia. The bottom smoothing press is microrock-covered. Two felts are used on the press section, each provided with a felt conditioner.

Vacuum for the couch, suction boxes, and suction presses is provided by five H-5308A conical vacuum pumps.

The 60-in.-dia. dryers, comprising 64 paper dryers, two Feeny dryers and four felt dryers designed for operation at 150 psi steam pressure, are arranged in four sections with a breaker stack between the second and third sections. There are four additional inter-calendar dryers. An automatic moisture control system regulates the steam supply to the machine dryers using the indicating pilot dryer principle of moisture detection. The pilot dryer, i.e. the last bottom paper dryer, "feels" the sheet across the entire width of the machine giving an average moisture reading.

The dryer section is completely enclosed in a hood as part of the conventional vapor removal system.

There are two calender stacks of the latest design, each equipped with a 40-in.-dia. bottom roll and seven 18-in.-dia. rolls.

The reel has a 48-in.-dia., constant-speed drum and is capable of winding 88-in.-dia. rolls.

To achieve maximum accuracy in weight control and uniformity, an AccuRay system is used for continuous basis weight measurement and automatic control. The system consists of: (1) a measuring unit located at the reel; (2) an operator's station housing the basis weight, X-Y and average recorders, and automatic controls; and (3) electronic equipment.

The winder is of motor-driven, two-drum design of 24-in.-dia. each and is equipped with shear cut slitters. Following the winder there is a cross conveyor equipped with shaft puller, roll breaker, and hydraulic lowering device. A manually loaded paper roll lowerer operating at 75 fpm is used to lower paper rolls from the second to the first floor.

A pulper — located under the last dryer, calenders and reel — repulps dry broke which is then pumped to a 32-ft.-dia., 35-ft.-high, vertical cylindrical, tile broke tank. Broke from the tank is returned through a breaker trap to the 11½-ft. by 16-ft., vacuum filter-type save-all.

The machine is driven by a 2,300-hp steam turbine through an Extremultus belt drive system permitting machine speeds of 400 to 2000 fpm.

There are three overhead traveling cranes: (1) a 25-ton (two 12½-ton trolleys), 67-ft.-span, five-motor crane; (2) a 56-ton of five-motor design (two 28-ton trolleys) crane; (3) a 30-ton, 30-ft. 8-in.-span, two-motor crane. The latter is installed in the reel room.

Power plant

The power boiler is designed to burn bark, natural gas and oil with provision made for future pulverized coal firing. It is a two-drum baffleless boiler with superheater and tubal flue gas air heater. It has a steam generating capacity of 300,000 lbs/hr at 600 psi and 750° F at the superheater outlet.

The bark is burned on a continuous discharge spreader stoker, while oil and gas are burned through tangential air registers located in the corners of the upper part of the furnace. The boiler has a dust collector, cinder recovery system (which includes sand separation) and over-fire air system to permit reburning bark char carry-over.

The boiler is further equipped with two electrc motor driven (Model 1K-300) sootblower units which are controlled from both local and remote "Start-Reverse" push button stations.

Feedwater for the boilers is made up of clear condensate returned from the evaporator, recovery furnace air heater and the paper machine. Additional makeup water is drawn from the hot lime Zeolite water softening system.

River water is screened through a traveling screen and then pumped by three, 5,200-gpm, vertical-type pumps driven by 450-hp motors to a 30-in.-dia. mill supply line. For boiler make-up, water is passed through a heat exchanger and the hot lime tank where its temperature is increased to 225° F. It then goes through three parallel-piped filters to the Zeolite softener and deaerator. Two turbine-driven pumps and one electric motor driven pump supply feedwater to the boiler.

The boiler is controlled by a combustion control and three-element feed water control system. A fuel selector switch mounted on the control panel permits easy selection of the desired fuel. A master steam pressure controller regulates both gas feed (or oil) and air to the burners, readjusted by fuel flow. The ratio of air for the bark and steam produced by the bark is maintained by controlling undergrate air.

All electric power is supplied by T.V.A.'s 15,000 KVA substation. The mill distribution system consists of three 1500 KVA, a 2500 KVA, a 3750 KVA, and a 5000 KVA unit substations. Some of these unit substations are equipped with multi-feader breakers others have 2300 volt starters. There are also seven 1000 KVA power centers and one 1500 KVA center.

RHEOLOGY

Continued from page 306

of the coating mixture is originally applied to the paper surface. A film of clay particles is deposited upon the surface of the paper due to the redistribution of the pigment when some of the fluid medium is taken away by the paper. This stratified coating structure is then run through the nip where the shearing effects create a highly fluid stratum, enabling the excess to be removed and leaving that portion that has been immobilized on the surface of the paper. The highly mobile stratum will also permit film splitting at the discharge side of the nip to provide a pattern in conformity with the degree of thixotropy as well as the influence of other factors.

The blade and air brush coaters also require thixotropic coating mixtures, although in most cases they need not be as highly thixotropic as for those processes where the coating is sheared in the nip. The degree of thixotropy for brush coating mixtures must be very small because of the mild mechanical treatment provided in the final smoothing unit.

Actually the coating mixtures applied by spraying or brushing should not exhibit the formation of an internal structure for best results. Brush marks are the result of structure formation in the coating layer prior to final smoothing. If the paper removes considerable water from the coating mixture, such structures become stiffer, showing greater brush marks.

Part VII will be continued in the September issue.

Now...ordinary groundwood becomes material for better grade papers

After five years of cooperative effort between Black-Clawson and a leading newsprint manufacturer, the Selectifier® Screen has been fully tested and proved to be unequalled for efficiency in pressurized screening of groundwood pulp.

Now you can control paper quality *in the pulp mill* with precision screening that gives certified cleanliness and fractionated fibers. Other advantages . . . complete automation, totally-enclosed, no foam or slime . . . consistencies of 1½% . . . spiral bevel gear drive *under* the screen.

May we give you full test results on this major breakthrough? Contact Shartle Division, Middletown, Ohio, GArden 2-4561.

SHARTLE DIVISION
Middletown, Ohio
COMPLETE STOCK
PREPARATION SYSTEMS

For more data circle 114 on Post Card

ALBANY FELT ROUND TABLE

Concluded from the July issue.

Synthetics

Root was called upon to discuss the current thinking on the use of synthetics in suction pickup felts. He said most of these felts have a synthetic content of 20 per cent or less. It has been apparent that, if higher synthetic content is used, yarn marks are the result or the felt operates closer with resulting crush marks. Most felts for suction transfer positions, regardless of grades being made, do have synthetic content. Of course, there are exceptions. Engle added that synthetic is not necessary unless felts are removed because they are worn out.

When asked if synthetic was incorporated in both the warp and filling yarns, Root replied it will vary from machine to machine and must be worked out by the evaluation of actual felt performance.

In answer to the question of whether uneven residual strength in warp or filling indicated abrasive wear, Gordon said it would depend on the type of felt. Even with the plain weave felt, the warp wear varied from that of the filling. The first wear that occurs is definitely on the filling. This is less true, of course, in some of the felts with one-sided weaves and the more complex weaves such as are used on suction transfer machines.

The filling strength is more apt to be representative of the amount of wear that took place, but there are exceptions. Uneven strength would be a possible sign of a machine condition.

Chemical treatments

Gordon mentioned that Albany Felt had made laboratory tests which proved beyond question that certain chemical treatments will increase the toughness of a felt, and for this reason performance has been greatly increased in many instances.

Hedberg emphasized that each treatment is designed to overcome a particular problem, and the use of treatment depends on the requirements of each machine on an individual basis. He explained there is no reason to use chemical treatments unless there is a specific need for it.

A paper mill superintendent from the South remarked they proved to themselves that treatments do make a difference by ordering two felts of identical construction at one time; one treated, the other untreated. The treatment designed to provide longer wear did just that.

When asked if chemical treatments were more to preserve the synthetic fibers than to preserve the woolen fibers, Gordon explained our principal efforts have been in the area of preserving wool fibers, since synthetics in most cases have much more resistance to abrasion and chemicals than wool. However, Woodside said, a synthetic content felt has more of a tendency to harden and compress than an all-wool felt. Therefore, there are many cases where the J-3 chemical treatment is used in conjunction with synthetic content felts to help keep them soft and open throughout their life.

Needled felts

Henry MacMillan, director of product design, stated the characteristics of needled felts are different from conventional woven felts. Because of this, there are undoubtedly applications where needled felts are superior, but on the other hand there are those applications where conventional felts are best suited to do the job.

In making a needled felt, a webbing is needled into a woven base fabric. When this is done, characteristics different from those of woven felts are developed. In the first place, needled felts have greater absorbency than conventional felts, probably due to the capillaries that are perpendicular to the plane of the felt. This is brought about by needling fibers at right angles to the plane of the base fabric, thereby producing capillaries that run vertically. This structure enables the felts to pick up water more readily.

In respect to finish in comparing a conventional pulp type with a needled felt in the same class, better finish is usually obtained from the needled felt. It is also thought better finish may be expected from a Medium Durasorb than from a Common Wet or a Common Cylinder Wet. Then, progressing to the finer classes, the difference between needled and conventional felts diminishes. Weight for weight, a needled felt is bulkier than a conventional felt. This has worked to advantage in cases of needled felts where it has been necessary to avoid suction hole marks.

Another characteristic of needled felts, an undesirable one, is that they tend to shed more fibers than conventional felts. This occurs most often at points of friction, such as suction boxes or Vickery conditioners. Control of fiber shedding in a needled felt is best handled by chemical treatments.

Albany has run one Durasorb felt on a suction transfer machine producing towelling. It stayed clean and picked up outstandingly well from the beginning. There was no fiber shedding problem although this is generally not critical on towelling.

One participant ran a needled felt on a pickup position and could not pick up with it. They were running an 86-lb. book sheet with the vacuum around 13 in. This was lower than on conventional felts. A superintendent from the Midwest said that, if a needled felt is run on the suction transfer position, suction wringers are necessary.

It was generally agreed that, where needled felts do work, they seem to work very well; longer life is one of the advantages.

Fiber shedding — woven felt

Everyone has fiber shedding problems from time to time. Woodside pointed out that usually it would be more noticeable with a new felt than with a felt that has been in use a number of days. An Eastern mill manager commented that special manufacturing techniques, developed by Albany and specifically designed to eliminate shedding, have solved this problem.

Woodside replied that we know any new felt is going to shed some fibers. Whether the shedding will be enough to cause a problem, we do not know. However, some of the fibers can be eliminated if the papermaker will take steps to combat the problem on his paper machine.

Most fiber shedding occurs during the first 24 hours and can be minimized by special manufacturing procedures. This is especially necessary where coated papers are run. One superintendent believes certain static electricity conditions will cause shedding, no matter what precautions are taken.

Warren B. Bullock

Fast increase in research expenditures — Newsprint output increasing month by month

Forecast on research expenditures

The rate at which research in the paper industry is expanding is demonstrated by recent figures showing that three paper companies alone have budgeted $13,000,000 for enlarged research facilities in the current year.

These items are only typical instances of appropriations being made throughout the industry in line with forecasts that the industry's research expenditures will eventually reach $200,000,000 a year as compared with today's 50 to 60 million.

Mead Corp. recently dedicated a $4,500,000 research center at Chillicothe, Ohio. Before the year is ended the Scott Paper Co. will open a $5,000,000 research plant at Philadelphia. St. Regis Paper Co. is building a $3,500,000 technical center at Clarkstown, N.Y.

Figures on exports

Confusingly different aspects of the pulp and paper industry picture appear in statistics from different segments of the industry. While over-all production of paper and paperboard is below that of a year ago, United States newsprint output is increasing month by month to record new levels in that field. Scandinavia is disturbed by imports of pulp from North America, and exports of paper, paperboard and paper products have reached record heights.

Production of paper and paperboard in the first five months of 1961 totaled 14.36 million tons — two per cent lower than in the comparable months of 1960. May production of newsprint in the United States, however, reached an all-time high record of 185,931 tons, an increase of 7.3 per cent over May 1960. North American newsprint output for the first five months of this year was also at an all-time high, 1.5 per cent above 1960, and United States newsprint output rose 3.7 for that five-month period.

There was a time when Scandinavian pulp dominated the price situation in the United States. Today, United States competition in the European market is disturbing the Scandinavian producers. According to the International Monetary Fund, a substantial part of Scandinavian pulp exports may be lower in price in the third quarter as exporting firms have decided to give discounts of 3 per cent on bleached sulfite pulp, 2 per cent on bleached sulfate pulp and 1 per cent on unbleached sulfate pulp. Says the Monetary Fund: "The immediate stimulus to price reductions is the supply of cheaper United States and Canadian pulp coming on the European market, although it is believed that the discounts will not bring Scandinavian prices down to those of the United States suppliers."

Final Government figures for 1960 show a handsome increase in that year's exports of paper, paperboard and paper products over 1959. The total tonnage of exports increased 12.6 per cent, but the increase in dollar value was somewhat lower, only 9 per cent. The largest single gain was in exports of industrial papers, 26.8 per cent in tonnage and 13.4 per cent in dollar value. The total tonnage of this grade exported in 1960 was 519,000 tons.

United States paper companies with operations abroad are a little disturbed by tentative administration proposals for various types of restrictions on the operation of foreign subsidiaries of American companies. With so many American companies beginning to establish branch plants abroad to compete with foreign producers in their home bailiwick, the various proposals may increasingly handicap investment abroad.

On community relations

The manner in which community relations of paper mills to their home localities are being given wider and wider attention is exemplified by a recent annual meeting of the Wisconsin Paper Industry Information Service at Wisconsin Rapids. At this meeting M. J. Schulenberg, director of public relations for Kimberly-Clark Corp., said that during the last twelve months the paper industry had spent $40,000,000 in Wisconsin for expansion programs to retain and expand national and world markets. Listing the installation of six new paper machines — Consolidated Water Power & Paper Co. at Whiting; Kimberly-Clark Corp. at Niagara; Wausau Paper Mills at Brokaw; Nicolet Paper Co. at DePere; Nekoosa-Edwards Paper Co. at Nekoosa; and Charmin Paper Co. at Green Bay — Mr. Schulenberg said additional millions were spent by other companies to rebuild existing machinery. Among the outstanding phrases of the industry's importance to Wisconsin are that it ranks first among the nation's paper-making states, that the capital investment is nearly $900,000,000, and that the annual pay roll average on 39,200 workers is about $225,000,000 a year.

The extent to which paper companies are devoting attention to the education of school children in the communities where their mills are located, is shown by a single, recent report of the industry's community relations department. Minnesota & Ontario Paper Co. gave 70 high school chemistry students at International Falls, Minn., three days of sessions for the study of papermaking and the chemistry problems involved. International Paper Co.

FIGHT "HEAD" ACHES 3 WAYS
with the NEW
LAMB PAPER HEAD CUTTER

1 **CUT HEADS TO EXACT SIZE NEEDED.**

2 **MINIMIZE COST BY REDUCING LARGE HEAD INVENTORY.**

3 **RELEASE HEAD STORAGE SPACE FOR MORE PRODUCTIVE USE.**

A corner-cutter, a cost-cutter, and a head cutter—Lamb delivers all three in *one* efficient, dependable machine that takes up just 30 square feet of floor space.

No need to stock heads in a wide variety of sizes. Cut to exact size only the quantity needed for current production. Operator sets diameter directly on graduated scale. Air operated, pivoting stack clamp is foot-pedal controlled, leaving both hands free.

Write for folder and price.

LAMB

LAMB-GRAYS HARBOR CO., Inc.
HOQUIAM, WASHINGTON, U. S. A. • PHONE: GEneral 8-1000

For more data circle 116 on Post Card

CURRENT COMMENTS

Continued from page 313

cooperated with the Niagara, N.Y., public schools television program by showing how trees become paper.

Net incomes

In our June issue, an error was made in stating the net income figures for Brown Company. Corrected statement should read: Brown Co. — Net income for the year ended November 30, 1960, was $1,347,468 as compared with the previous fiscal year total of $714,203.

Stock and Bond Quotations

New York Stock Exchange

Closing Prices	July 10, 1961	July 10, 1961
American Can	42¼	40¾
Same Pref	37⅝	38
Celotex	29	28¼
Same Pref	*19-19⅛	19
Certain-Teed	54¾	58¾
Champion P & F Co.	31¼	32¾
Same Pref	*92¼-93¾	92⅛
Chesapeake of Va.	*36-36⅝	39¼
Container	23¼	27⅝
Same Pref	*93½-94	*83-84
Continental Can	40½	41¾
Same Pref	84-85¼	84¾-85¼
Crown Zellerbach	54	59¼
Same Pref	*94-95	94½
Diamond National	41	46¾
Same Pref	31½	*31¼-31¾
Federal Paperboard	36	38¼
Same Pref	*23⅛-23¼	*23-23¾
Fibre Paper Board	29⅞	33¼
Great Northern	56	62
Hammermill	31	31
International	30¾	33⅛
Same Pref	*94¼-95½	*94¼-95¾
Kimberly-Clark	80	83½
KVP Sutherland	34½	37⅜
McAndrews & Forbes	35	*34¼-35
Masonite	31	31⅝
Mead Corp.	39½	40¼
Same Pref	*91-92½	*92-92½
Minn & Ont	32⅛	32
Nat Vulc Fib	24¼	25
Oxford Paper	31¼	32½
Same Pref	*96-98	*94-95
Rayonier	20¼	21¼
Riegel Paper	31½	35⅛
St. Regis	34½	38
Same Pref	*98-99	98
Scott Paper	109	110¾
Same $4 Pref	94	*95-96
Same $3.40 Pref	*77½-79	77½
Sealright	39¾	39
Standard Pack	23	24⅜
Same $1.60 Pref	70	75
Same $1.20 Pref	28	25¾
Same 6% Pref	29½	30¼
Union Bag-Camp	36⅛	39¾
United Bd & Cart	*21⅜-22¾	23
U. S. Gypsum	103½	101½
Same Pref	*154-155	*153-155
West Va P & P	34¾	38
Same Pref	*96½-97	*96-96½

New York Stock Exchange — Bonds

July 10, 1961		June 10, 1961
Champion P&F Co. 4½%	108	113
Champion P & F Co 3¾%	94⅛	93⅜
Diamond Gardner 4%	——	92
Kimberly-Clark 3¾%	——	91¾
Oxford 4¾%	110	115½
Scott 3%	140	141

American Stock Exchange — Stocks

Allied Paper	14¼	15⅛
American Writing	33	33½
Brown Co.	13	14⅝
Puget Sound	22¼	23⅛

*Closing Bid and Asked Prices

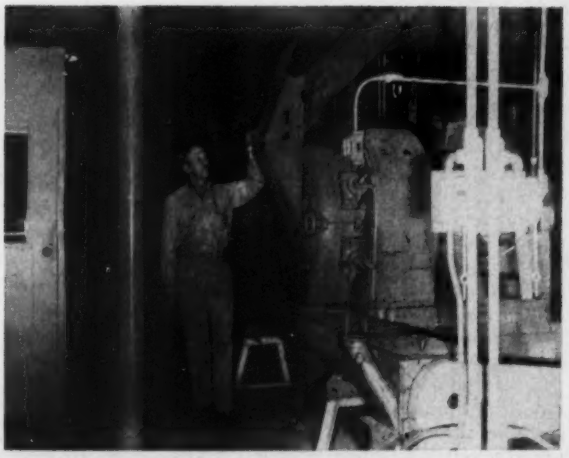
Sprout, Waldron Announces Pelleting Process

A unique shredding, drying and pelleting process which makes it economical and profitable to burn bark for fuel has been announced by Sprout, Waldron & Co. Inc. of Muncy, Penn.

The new system consists essentially of a hammer mill for shredding the bark, a special flash drying system, pelleting equipment and the necessary auxiliary materials handling units for conveying and storing the pellets, as well as for blending the pellets with coal. The operation is continuous and completely automatic, requiring no more than one operator for supervision and maintenance purposes.

A successful installation is already in operation at Southern Extract Co. in Knoxville, Tenn. The unit is designed to shred the bark, pellet it, and then store it for automatic and continuous metering into the coal bunkers. It is estimated that savings from the new process are in the area of 17½ tons of coal per day.

According to Ray Shook, sales of Sprout-Waldron's Pulp and Paper Mill Division, the bark pellets formed by the new process give burning rates equivalent to the soft coal currently in use at Southern Extract.



Sprout, Waldron bark pellet mills

International Conference Held by Manufacturers of Clupak

A two-day conference, the third in a series of annual international technical symposiums, was held recently by Clupak Inc. at the Cloister, Sea Island, Ga. Some 18 companies were represented including men from Finland, Canada, Germany and Japan.

The objective of these meetings is to review the latest technical aspects of Clupak extensible paper production and to bring all licensees up to date on the very latest research and development work. Discussions covered economic phases of paper production, machine improvements, and new market end-uses.

Clupak Inc. is offering a new 16-page, pocket-size "Facts Book" on extensible paper. The booklet tells what Clupak extensible paper is, why it is important, how it is made, and how it differs from conventional paper. The booklet also contains photographs showing typical applications and gives information on Clupak coated with polyethylene, asphalt or wax, impregnated with wet-strength resins, and bleached or colored. Booklets are available by writing to: Clupak Inc., 530 Fifth Ave, New York 36, N.Y.

Oregon Forest Research Center Changes Name

The Oregon Forest Research Center has become a part of the Oregon State System of Higher Education and is now known as the Oregon State University, Forest Research Laboratory.

The Forest Protection and Conservation Committee will become a part of the Oregon State Board of Forestry, 2600 State St., Salem, Ore. All future correspondence pertaining to the Center should be addressed: Oregon State University, Forest Research Laboratory, P.O. Box 571, Corvallis, Ore.

New National Trade Association

A new national trade association to be known as the Gift Wrappings and Tyings Association has been formed and will be operated as a division of the Tissue Association Inc.

This association represents the gift wrapping industry. It is made up of manufacturers and converters of paper, aluminum foil, ribbons and related products. Objectives of this group are to include the improvement of statistical knowledge for markets, channels of distribution, and packaging.

Officers of the new association are: John Cahil of Ben Mont, Dow Chemical Co., Dobeckman Div., as chairman; and Arthur Dreyer of Chicago Printed String Co., as vice chairman.

Manufacturers interested in additional information on this new organization are asked to write or call Ross A. Fife, Gift Wrappings and Tying Association, 122 East 42nd Street, New York 17, N.Y. Phone: Oxford 7-1874.

Mount Hope Appoints Walther

F. P. Walther Jr. & Associates Inc., Boston, Mass. and New York, has been appointed advertising agency for Mount Hope Machinery Co. of Taunton, Mass. The new advertising program will concentrate on newsletter advertising emphasizing actual applications of the company's equipment.

recent expansions

Field Paper Now Operating In New Plant

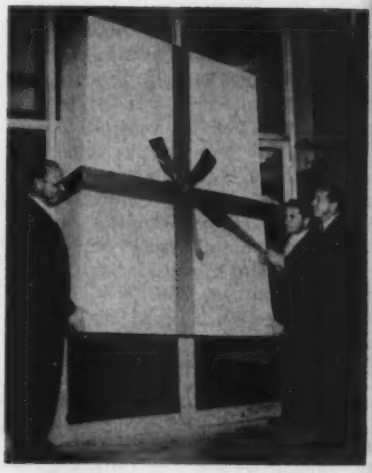


Photo above shows die-cutting operation at Field Paper Box Co. Photo below shows (left to right) Len Niemiec, vice president and sales manager; Bob Rafanelli, company vice president; and Eli Field, president, lifting the top of a paper box off the door of Field's new manufacturing plant and executive offices.

FIELD PAPER BOX CO., an independent producer of folding and set-up boxes in the Chicago area, is now in full operation in the company's new plant located in Elk Grove Village, Ill.

The new, one-story structure is built on a 330,000-sq.-ft. site and has been built with curtain-wall construction to enable further expansion. Storage and production facilities are arranged so that when new machines are added, the storage area on the west end of the building can be easily adapted to make room for new equipment.

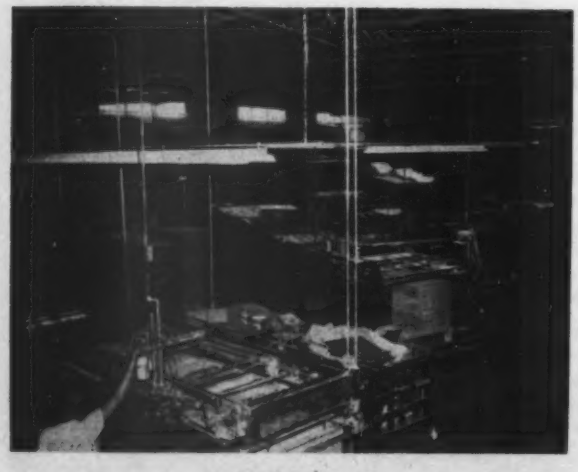
Entire layout of the plant has been designed to provide the ultimate in production efficiency. There are no walls in the production and storage areas, no projections or pipes to interfere with material flow. To provide direct access to each department, wide aisles have been arranged between the press, die-cutting, gluing and set-up box sections. Machines in these sections have been placed on an angle to provide storage for material prior to the next production step. Modern offices are located at the south end of the building along with large locker and employee washrooms and completely automated lunchroom to provide Field employees with every convenience.

Eli Field, president of the company, stated: "Our new plant has been custom-designed to meet production requirements and our process of manufacture has determined the shape of the factory".

Currently, the company is one of the few independent companies utilizing highly specialized machinery for unique processes such as latex pressurized sensitive box ends for folding boxes, latex cards and heat-seal, bubble and blister pack and heat-seal for frozen food packaging.

The company produces all types of folding and set-up boxes to fit specific requirements. Among the many industries it serves are: toy, candy and confectionery; dairy; electrical; hardware; sports equipment; automotive; and plastics. The firm anticipates providing new and even more varied products through its new facilities.

In addition to the production of custom-designed boxes, the company's subsidiary — Field Paper Products Co. — maintains one of the largest inventories of stock folding and set-up boxes. Its stock on hand includes more than 50 various size boxes for immediate distribution.



press room

Georgia-Pacific Drops Plans On Alaska—Plans California Development

James L. Buckley, president of Georgia-Pacific Alaska Co., a subsidiary of Georgia-Pacific Corp. has announced that the company has decided to further expand its Samoa, Calif., properties rather than pro-

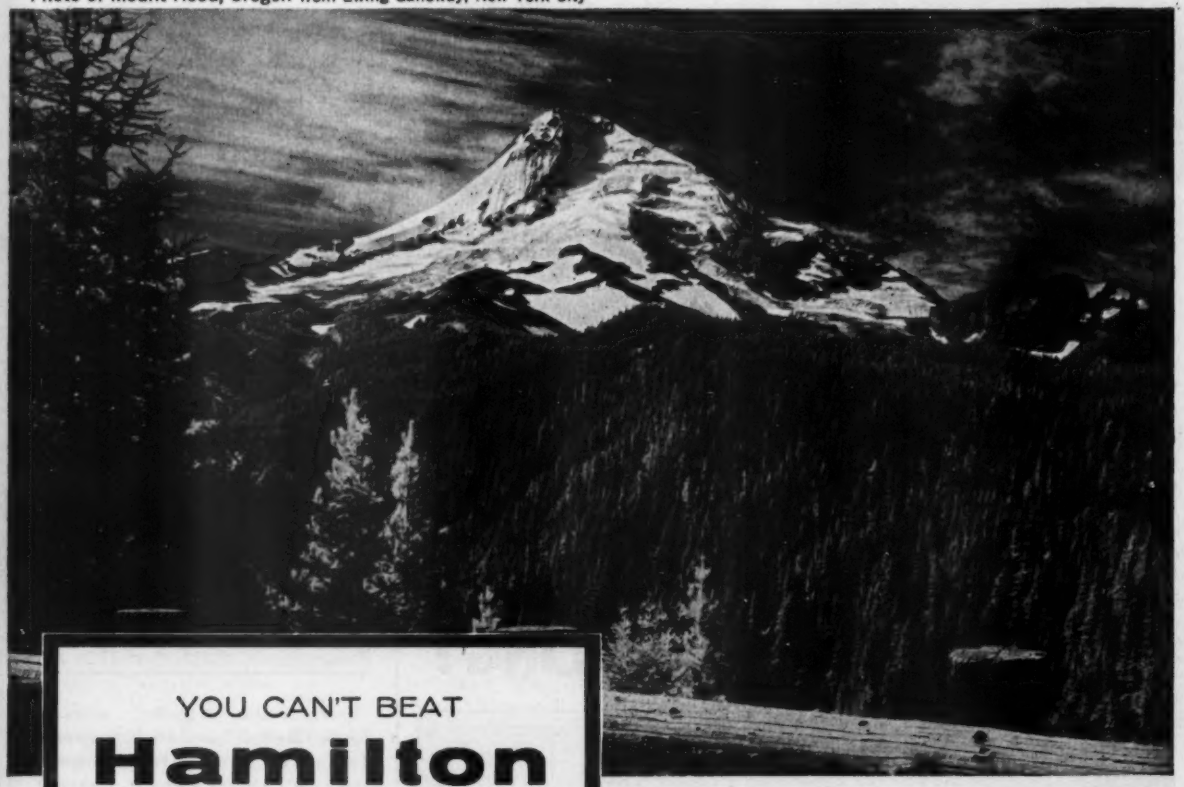
Continued on page 318

HAM FELTZ says:

"Reminds me of HAMILTON Felts... smoothness combined with rugged strength!"

*Idea submitted by John A. Sigrist, Packaging Corporation of America, Rittman, Ohio.

Photo of Mount Hood, Oregon from Ewing Galloway, New York City



YOU CAN'T BEAT

Hamilton FELTS

*WIN... *A NEW Shakespeare Spincast Fishing Outfit!*

"What famous place reminds you of Hamilton Felts? Tell us why in a few words; sign your name and address and name of company. Each idea from a U.S. papermaker that we use wins a new 1961 model Shakespeare Spincast Rod and Reel—FREE! When identical winning ideas are submitted by 2 or more papermakers, the one with the earliest postmark will be considered the winner. Every U.S. papermaker *entrant* receives a famous Rex Spoon fishing lure — FREE. Send me your suggestion — today.

Ham Feltz, Dept. I
612 First National Bank Bldg., Cincinnati 2, Ohio."

"The smooth, easily compressed cushion provided by Hamilton Felts produces a fine, uniform finish, free of felt marks. The spaces between threads stay open to let water pour through under the extra pull of suction headboxes. And, as you know, the more water you remove at the wet end, the less you have to cook out at the driers. That's why, with Hamilton Felts, drying costs come down, while tonnage — and profits — mount.

"If one of our 300 modern, technically proven styles won't solve *your* needs, we'll be happy to design a Hamilton Felt that will. Just ask your Hamilton Felts Service Salesman."

SHULER & BENNINGHOFEN, HAMILTON, OHIO

For more data circle 117 on Post Card

Continued from page 316

ceed with the development of pulp and paper facilities in Alaska.

In stating the reasons for the present decision, Buckley stated: "We have large quantities of redwood and douglas fir waste material from our plywood and sawmill operations in the Eureka-Samoa area in Northern California that can be converted into pulp chips at a very low cost. Through research we have recently determined that redwood chips particularly make a high grade kraft pulp. The economics for such a development are far more favorable than the Alaska development at this time."

Concerning the Alaskan development, Buckley said: "Changes in economic conditions and technologic developments in the next few years may make the Alaskan project practical and desirable at some time in the future. We own an excellent mill site near Juneau, and with the extensive surveys of water, power and timber we have made in the Juneau area, Georgia-Pacific would be unusually well qualified to develop the Alaska properties at a propitious time. We shall watch developments in the area with a keen interest".

New Jamesbury Plant

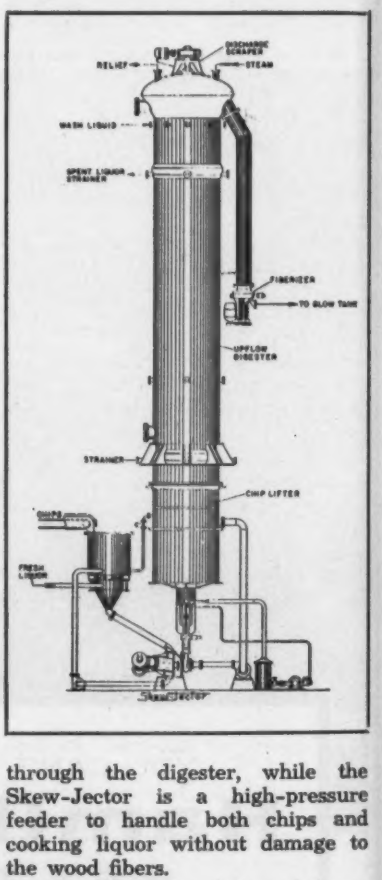
Jamesbury Corp. has let a contract for construction of a new 87,000-sq.-ft. plant. This is twice the space the 7-yr.-old company now occupies and is the fifth move to larger quarters the firm has made since its inception. At the cost of $600,000, the plant will be built on an 8½-acre site in Worcester, Mass., as the first building in a new industrial park. Occupancy is expected about November 15, 1961.

Potlatch — First To Install New Digester

The first continuous Impco vertical digester will be installed for the production of kraft pulp at the Lewiston, Idaho, mill of Potlatch Forests Inc.

Instrumentation of the new digester will be compatible for the flow of information to the recently installed IBM 1710 computer for improved quality control and uniformity in production of kraft bleachable pulp for folding cartons and specialty paperboard. Information recorded will assure uniform high quality and the programming of special orders.

The new installation will utilize the Impco Chip Lifter and the Skew-Jector. The Chip Lifter is a machine for moving chips upward



through the digester, while the Skew-Jector is a high-pressure feeder to handle both chips and cooking liquor without damage to the wood fibers.

In operation, the chips and liquor from the Skew-Jector are fed into the Chip Lifter, which advances chips slowly up as a compact mass. The liquor moves independently and overflows through a strainer at the top after which it is sent to the recovery plant. Cooked chips are removed from the top by a scraper to the blow tank. The pulp is delivered to the bleach plant without bleach plant modification, except that this continuous pulp process has eliminated the need for one stage of brown stock washing.

Another feature, from a community standpoint, is that pulp discharge is more easily and closely controlled, which will aid in the abatement of odor and discharge of non-condensable gases.

Installation is scheduled to begin September 18.

THINKING ABOUT
BULK HANDLING?

Everyone knows Bulk Handling will cut costs—save money . . .

The important point is:

FLUIDIZER
CAN DO IT *BETTER*... BECAUSE
FLUIDIZER HAS THE *EXPERIENCE*

Fluidizer pioneered in this area and knows what will work and how to pinpoint capabilities and limitations. You don't pay the penalty for costly guesswork. Experienced Fluidizer engineers create unique and imaginative approaches to specific customer requirements. Successful performance proved by repeat purchases. Call us for the *facts*.

Proven record for conveying: Sugar (including powdered) Starch, Flour, Dried Milk, Chemicals, Plastics, Clays, etc.

Fluidizer®
made by FLUIDIZER DIVISION
OF DAFFIN CORPORATION
Hopkins, Minnesota • Phone West 8-7651

AIR CONVEYING SYSTEMS . . . *"most advanced in modern Air Handling"*.
For more data circle 118 on Post Card

Stone Container Moves Into New Headquarters

Stone Container Corp. of Chicago, Ill., has moved into the company's new corporate headquarters at 360 N. Michigan Ave., Chicago. The Chicago-based maker of corrugated containers and paperboard cartons is occupying the entire third floor of the building previously known as the London Guarantee & Accident Building. Since Stone's move, the building has been officially renamed the Stone Container Building.

The new quarters will house Stone's corporate management group, including departments handling industrial relations, corporate accounting, credit, sales, market research, advertising, public relations and product development.

"This move of the corporate headquarters into downtown Chicago", remarked Norman H. Stone, board chairman and president, "marks the beginning of the fourth stage in the development of our business and the one in which we should see accelerated growth in sales and earnings".

Stone is now operating four plants in the Chicago area. Outside the Chicago area, the company has paperboard mills at Mobile, Ala., and Coshocton and Franklin, Ohio; corrugated plants at Philadelphia, Penn., Detroit, Mich., South Bend, Ind., and Mansfield, Ohio; and paperboard carton plants at Detroit, Mich., South Bend, Ind., and Cincinnati, Ohio.

Black-Clawson Awarded $1.8 Million Contract

Port Huron Sulphite & Paper Co. has awarded a contract in excess of $1.8 million to Black-Clawson Co. for the manufacture of the principal paper production machinery in a multimillion-dollar expansion of its paper mill in Port Huron, Mich. The contract calls for a new paper machine and auxiliary equipment.

Export Division of International Paper

The formation of a new division charged with direction and coordination of International Paper Co.'s exports of paper and paperboard from its U. S. mills and its interests in overseas production operations, has been announced.

The new overseas divison will be responsible for the development and coordination of company policies with respect to overseas manufacturing operations and its export sales. The new division will also coordinate the efforts of the company's various overseas selling organizations, including International Paper Co. Ltd., Barand Cox Ltd. and International Paper Co. of Africa (pty.) Ltd.

Weston Paper Converts Mill

The new neutral sulfite semichemical pulp mill, utilizing native Indiana hardwoods, has been successfully placed in full operation by the Weston Paper & Mfg. Co. at its Terre Haute, Ind., corrugating medium mill.

The new pulp mill, converts the entire production of the plant from the use of straw to hardwoods. Designed to produce 150 tons of pulp daily, the new system involves the extensive use of electrically sequenced and remote control mechanisms for automatic operation.

The installation is somewhat unusual in that the new wood process was built adjacent to and tied into the existing system, so that the changeover from straw to wood has been accomplished without any interruption in the plant's production of .009 corrugating medium.

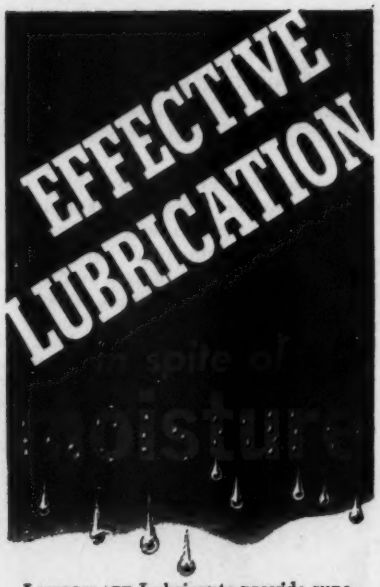
Designed and constructed by Rust Engineering Co., in conjunction with Weston engineers, the new pulp mill is currently producing a high quality of unbleached semichemical pulp to the mills two paper machines of 110-in. and 126-in. trim width at the Terre Haute site.

Weston, like other volume users of straw fiber, in recent years had been faced with declining availability of raw material within the immediate area of its mill. As a result of changed wheat harvesting methods, acreage allotments, and the use of short stemmed wheat varieties, along with rising farm labor and transportation costs, the availability and profitability of wheat straw had become so closely related to seasonal weather conditions that it became necessary to seek an alternate raw material source.

A. E. Staley Dedicates New Research Center

A new research center was opened recently by A. E. Staley Mfg. Co. of Decatur, Ill. The center with a staff of 180 was dedicated to develop new and more useful products for the nation's household consumers, food, paper, textile and other industries.

A. E. Staley Jr., chairman of the company, stated: "In the last few years our research effort has been doubled and redoubled, and results



LUBRIPLATE Lubricants provide superior lubrication even in the presence of moisture and steam. They permit high speed operation, have exceedingly long life and do not break down. There is a LUBRIPLATE Lubricant, ranging from the lightest oils to the heaviest greases, to meet every requirement of the paper industry.

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

LUBRIPLATE is available in grease and fluid densities for every purpose . . . LUBRIPLATE H. D. S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK" . . . a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

For more data circle 119 on Post Card

of the accelerated program are beginning to show up in new processes, plant and products. The new research center provides essential facilities for these expanded activities".

Special facilities are provided in the center for laboratory supplies, microscopy, spectroscopy, photography, glass blowing, equipment making, water distillation and distribution, shipping, sample storage and care of glassware. The largest piece of new equipment is a multipurpose pilot paper coating machine capable of drying a 10-lb, per-side coating on a 20-in.-wide sheet at speeds up to 2,000 fpm. Other equipment includes a three-roll, B. F. Perkins supercalender, equipped for continuous calendering; a precision trailing blade coater; a Concora medium tester for wet end additives; and a Hinde & Dauch crush tester.

Dr. M. L. Cushing, head of Staley's paper research laboratories, checks work on supercalender unit in the new Staley Research Center. Extensive research facilities serving the paper, boxboard, corrugating building materials, adhesives and related industries are provided in the new Center.

world renowned in processing machinery

The LEHMANN VORTI-SIV

has surprised the

PAPER INDUSTRY

This amazing screening machine never fails to impress paper mill executives who see it at work on: starch, clay and latex coatings; pigment slips; beater starch; tall oil; debarker water; and other materials. Some of the advantages are: use of finer mesh screens, fewer rejects, increased capacities, better product control and generally improved results. The gyratory action of the VORTI-SIV is adjustable both in speed and amplitude of gyration, to suit the material processed. It screens solids, liquids and slurries in meshes from 4 to 400. The screen is practically non-blinding.

Write for further information or a demonstration in our plant — or contact the Lehmann distributor nearest you.

J. M. LEHMANN COMPANY, Inc., Lyndhurst, N.J.

— or —

Chas. L. Burks & Co.
Post Office Box 54
East Point, Georgia

Halsell Brokerage Co.
3101 Walnut Street
Denver 5, Colorado

Geo. E. Missbach & Co.
3330 Peachtree Road, N.W.
Atlanta 5, Georgia

Wm. B. Sandford, Inc.
601 West 26th Street
New York, New York

Duncan Equipment Co.
506 Broadway
Seattle 22, Washington

Harry Holland & Son, Inc.
10600 Puritan Avenue
Detroit 38, Michigan

Morton-Myers Co.
220 E. Missouri Avenue
Kansas City 6, Missouri

Webster Equipment Co.
549 W. Randolph St.
Chicago, Illinois

Geo. R. Mellema Co.
620 Plymouth Building
Minneapolis 3, Minnesota

Rawdon Myers Agency
Blue Ash Center Bldg.
Cincinnati 42, Ohio

Sada y Himes S.A., Apartado 911, Padre Mier 1250 Pte., Monterrey, N.L., Mexico

See our advertisement in Chemical Engineering Catalog

For more data circle 120 on Post Card

Coming Events

TAPPI

September 6-8 — 11th TAPPI Corrugated Containers Conference, St. Francis Hotel, San Francisco, Calif.
September 19-21 — 4th International Mechanical Pulping Conference, Edgewater Beach Hotel, Chicago, Ill.
October 4-6 — 6th Deinking Conference, Harris Hotel, Kalamazoo, Mich.
October 9-11 — 16th Plastics—Paper Conference, French Lick-Sheraton, French Lick, Ind.
October 15-19 — 16th Engineering Conference, Shoreham Hotel, Washington, D. C.
November 1-3 — 15th Alkaline Pulping Conference, Rice Hotel, Houston, Texas.

PIMA

August 31-September 9 — Annual Meeting, New York-Canadian Division, Saranac Inn, Upper Saranac Lake, N.Y.
September 20-22 — Fall Meeting, Northwestern Division, Faust Hotel, Rockford, Ill.
September 21-24 — Northwestern Division, Poland Spring House, Poland, Maine.
October 5-7 — Connecticut Valley Division (joint meeting with TAPPI), Equinox House, Manchester, Vt.
October 11-13 — Southeastern & Southern Divisions (annual fall joint meeting), Jung Hotel, New Orleans, La.
October 12-14 — Pennsylvania-New Jersey-Delaware Division Fall Meeting, Claridge Hotel, Atlantic City, N.J.
October 19-21 — Miami Valley Division Annual Meeting, French Lick-Sheraton, French Lick, Ind.
October 20 — Annual Fall Meeting of the Michigan Division, Dearborn Inn, Detroit, Mich.
November 30-December 1 — Pacific Coast Division Fall Meeting, Olympic Hotel, Seattle, Wash.

OTHER MEETINGS

September 11-15 — International Industrial Conference, San Francisco, Calif.
September 11-15 — 16th Annual Instrument-Automation Conference & Exhibit, Biltmore Hotel and Memorial Sports Arena, Los Angeles, Calif.
September 25-28 — Industrial Building Exposition & Congress, New York Coliseum, New York, N.Y.
September 27-30 — Third Virginia Biennial State-Wide Industrial Exposition, Roanoke, Va.
October 5-8 — Paper Stock Institute Fall Meeting, Arlington Hotel, Hot Springs, Ark.
October 15-19 — 17th Annual International Instrument-Automation Conference & Exhibit of the Instrument Society of America, New York Coliseum, New York, N.Y.
October 16-20 — 23rd Annual National Packaging Forum, Biltmore Hotel, New York, N.Y.
October 19-20 — 1961 National Conference on Industrial Hydraulics, Sherman Hotel, Chicago, Ill.
October 22-25 — N.P.T.A. Fall Convention, Conrad Hilton Hotel, Chicago, Ill.
November 7-9 — 15th Annual Symposium & Exhibit of the Point-of-Purchase Advertising Institute, McCormick Place, Chicago, Ill.

NAMES IN THE NEWS

Valley Iron Works Corp.

Bud Ellman, a development engineer with Valley Iron Works, Appleton, Wis., has been blazing a successful racing trail in national competition. He will appear in five major races throughout the country this summer. Ellman has a trained team of mechanics headed by George Reynolds, chief engineer of Valley Iron Works.

Bemis Bro. Bag Co.

K. W. Koechig has been named manager of the Indianapolis, Ind. plant and sales division of Bemis Bro. Bag Co. He succeeds Dexter A. Clarke who has been transferred to a similar post in Minneapolis, Minn.

R. P. Perry has been appointed to the company's newly created position of director of product development, in Minneapolis. Perry was formerly manager of the Minneapolis plant and sales division, a position being taken over by Clarke.

Champion Papers Inc.

G. A. "Jerry" Jackson has been appointed director of a newly created administrative services dept., for Champion Papers of Hamilton, Ohio. Jackson will be responsible for purchasing, traffic, insurance personnel, office service and materials management and planning.

Managers for key functions within the department include: Carlisle Knowlton, manager of traffic; R. E. Lane, manager of purchasing; Robert Kosar, manager of materials management and planning; and Robert Weiser, manager of general office services.

Owens-Illinois

Peter M. Coy has become general manager of the Owens-Illinois Paper Products Division's corrugated shipping box plant in Bristol, Pa. Coy has served as assistant general manager at the division's Jacksonville, Fla., plant, since last September and was production manager there previously.

Hyatt

Brunson

Antara Chemicals

Robert C. Hyatt has been appointed director of marketing, for Antara Chemicals, a division of General Aniline & Film Corp., New York, N.Y. In his new position, Hyatt will succeed James M. Cloney who has been named general manager of the company's Ozalid Division.

William C. Brunson has been named midwest regional sales manager. He succeeds G. A. Brost who was appointed to the position of product manager — Intermediates.

John A. Manning Paper Co. Inc.

A. H. Miller has been elected president and chief executive officer of this company in Troy, N.Y. Miller was formerly president of Lewis-Brownville Sales, Inc., and before that was associated with Kimberly-Clark Corp.

Miller

Kirby

Ludlow Papers

Paul T. Kirby has been promoted to the position of product manager for the rust preventive paper, at the Ludlow Papers division of Ludlow Corp., Needham Heights, Mass. Kirby will be responsible for coordinating an expanded sales and promotional effort.

Nielsen

Rasmussen

Nichols Engineering & Research Corp.

E. Hart Rasmussen has been appointed manager of the Spray Dryer Division. In his new capacity, Rasmussen will be in charge of sales to the pulp and paper industry and allied fields.

H. Bach Nielsen has been appointed assistant to the general manager of the firm. In his new capacity, Nielsen will have over-all supervision of Nichols' sales, which includes the supplying of equipment and engineering services to the pulp and paper field.

Riegel Paper Corp.

John Apgar has been promoted to controller of the company's Folding Carton Division at the Newark, N.J. plant. Apgar has been corporate controls coordinator.

Dwight E. Wheeler was named divisional controller of the Flexible Packaging Division and will temporarily be located at Milford, N.J.

Jerome V. Bennett has been promoted to Wheeler's former position of Paper Division Controller. Bennett was previously manager of budgets and standards at Milford.

A major realignment of the operating divisions of the company has taken place to integrate the recently acquired Lassiter Corp. and Bloomer Bros. Co. with Riegel.

A flexible packaging division has been established with J. Hanes Lassiter, vice president, named general manager of the division. This division will handle the production and sale of converted flexible packaging materials.

A paper division has been set up

Continued on page 338

FOREIGN ABSTRACTS

Behavior of solutions of two metallic complexes

This is a comparative study. The probable structure of the two complexes: the copper-containing Fehling solution (I) and the iron containing complex ("EWNN") are shown respectively in Figures 1 and 2. In either case tartaric acid and sodium hydroxide were present. Both I and EWNN served to precipitate certain polysaccharides as the metal sodium

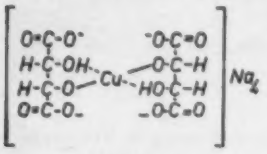


Figure 1

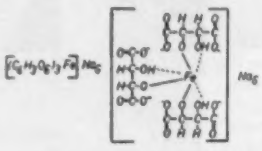


Figure 2

tartrates from their alkaline solutions. For example, both I and EWNN precipitated mannan, alginates, and xylans from their alkaline solutions. However EWNN failed to precipitate glucans (**e.g.** cellulose), which was precipitated by I. The precipitated polysaccharides normally would be redissolved by the addition of glycerol. Within a narrow range of concentrations, EWNN was a good cellulose solvent, whereas I, even over a wide range of concentrations, failed to dissolve cellulose. The selective precipitations of the polysaccharides by I and EWNN are of interest and are discussed.

Georg Jayme and Knut Kringstad. **Das Papier 15,** 127-30 (1961) (In German).

Soluble base recovery from sulfite spent liquor

Magnesium and sodium ash recoveries are described, together with data and appropriate flow charts. The influence of furnace conditions on the composition of magnesium ash is discussed. Figure 3 shows the phase diagram of the system magnesium oxide—magnesium sulfate—magnesium sulfide. Within the white areas of this diagram, at least 99 per cent of the base is present as the component shown. Line a indicates a temperature line for abiatic combustion of the spent liquor (containing 55 per cent solids) by the use of air, entering at 20°C., and insuring complete combustion. In the case of the soda recoveries, a review is given, with schematic flow charts representing the following recovery methods: "Institute", Mead, Bradley-Western, Sivola, Skutskar, and A.S.T. sequences.

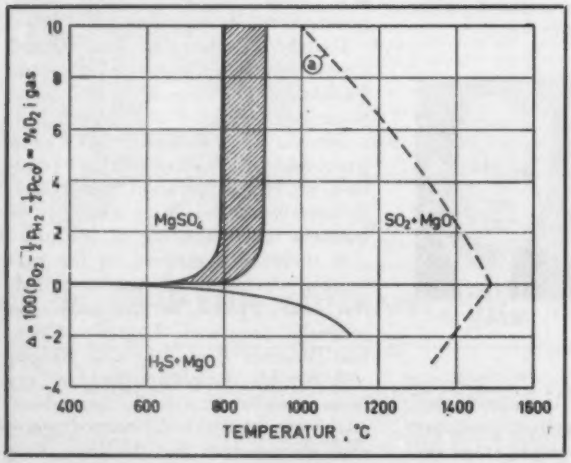


Figure 3

O. Hultin. **Paperi ja Puu** (Finland) **43** Special. No. 4a 181-92 (1961) (Original in Swedish, with English summary).

Papermaking engineering at Darmstadt

This is a well-illustrated report of the various engineering and chemical courses given at the School of Papermaking at the Technische Hochschule at Darmstadt. The history and development of the present program are described, and the entire curriculum of the engineering group is given. Figure

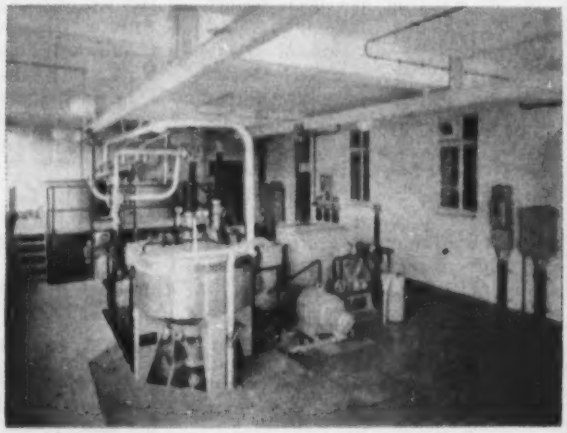


Figure 4

4 (one of 6) shows the equipment for continuous stock preparation. Other illustrations show the grinder, experimental papermachine, and an experimental calender. Besides these the usual modern equipment required for teaching and research are described briefly, and the layout for pulp and paper manufacture is shown in a schematic sketch.

Hellmuth Muller Clemm. **Das Papier 15,** 121-126 (1961) (In German.)

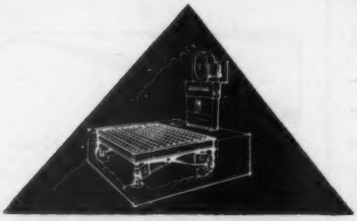
Effects of soil on growth of Monterey pine

The pine, grown in the Northern Buenos Aires Province was shown to be very sensitive to soil conditions, and highly affected by an excess of clay in the soil. **E.g.** there was a decline and mortality among trees grown north of Buenos Aires, when the clay reached 40 to 50 per cent. The species grew with some difficulty in soils containing 37 per cent clay, and tolerated 28 per cent clay. In that same region, this species grew satisfactorily in sandy soils. Such unfavorable factors as impenetrable layers of marine shell sediments not only weakened the trees but they also led to insect and fungal attack.

Seventeen references. Wilfredo H. G. Barrett and Antonio J. Garbosky. **Rev. invest. forestales** (Buenos Aires) **2,** No. 1 67-88 with 7 plates) (Original in Spanish with an English summary), through **Abstr. Bull. Inst. Paper Chem.** 31, No. 10, 1485 (1961).

...CUT COSTS AND SAVE TIME WHEN WEIGHING MATERIALS ON POWER OR HAND TRUCKS

FAIRBANKS-MORSE WAREHOUSE SCALES



Self-Contained Scales

- For general use in factories, warehouses, shipping rooms, foundries, paper mills and other industrial applications.
- Thirty different models for your special requirements... with direct-reading "Floaxial" Dials, with or without "Printomatic" weight recorder or with Double Beam. Capacities from 600 lbs. to 3200 lbs.
- All models feature the F-M Type "S" Lever System—a suspension system that swings parallel to the direction of traffic... thus protects scientifically ground pivots and bearings... results in accuracy that lasts for longer periods of time.

Built-In Floor Scales

- Especially designed for heavy-duty use in metal working plants, steel mills, paper mills, textile mills, mines... and for general factory use.
- Available for installation in a pit or suspended from the floor, with direct-reading "Floaxial" Cabinet Dial, with or without "Printomatic" weight recorder, or Double Beam. 20 different models with capacities up to 10 tons.
- All models feature the F-M Type "S" Lever System for complete accuracy over longer periods of time.

For complete information on any or all Self-Contained and Built-in Scales, write: **C. G. Gehringer, Marketing Director, Scale Division; Fairbanks, Morse & Co., 100 Electra Lane, East Station; Yonkers, New York.**

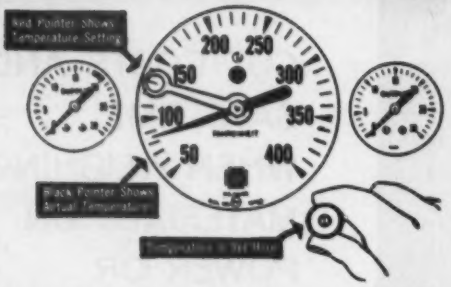
FAIRBANKS MORSE

A MAJOR INDUSTRIAL COMPONENT OF

FAIRBANKS WHITNEY

For more data circle 121 on Post Card

New wet end dryer control improves finish . . . helps stop picking, curling, cockling on all types of paper



Picking, curling and cockling of paper or board usually means one thing—poor temperature control on the first few wet end dryers.

The best way to end this problem is with the new Stickle automatic temperature control for individual wet end dryers.

This system makes it easy to set any temperature desired in each dryer. And once set, temperatures are maintained automatically, within 1% plus or minus.

The system shows at a glance the temperature set, actual temperature inside the dryer, flow and temperature of condensate leaving each dryer.

It is the fastest acting, the simplest and most accurate system ever developed for this purpose. Yet it costs less to install, less to operate and less to maintain than any other system. And, when installed as directed, the system is guaranteed to meet predetermined standards.

Write, wire or phone for details.

FREE!

Bulletin 560-A

Shows at a glance the step-by-step operation of the new Stickle system for automatic temperature control of wet end dryers.

STICKLE STEAM SPECIALTIES COMPANY

2215 Valley Ave. • Indianapolis 18, Ind.

Moisture Control Systems
Dryer Drainage Systems
Feed Water Heaters
Vacuum Pumps
Micro Adjustable Orifices
Differential Control Valves

Stickle Equipment
Cuts the cost of steam

For more data circle 122 on Post Card

PATENT REVIEWS

Dr. Melvin Nord

Liquid dispersion conduit

U. S. 2,970, 644 issued Feb. 7, 1961 to David R. Webster relates to an inlet for the headbox of a paper machine.

The present device distributes liquid along the length of a conduit, firstly by having the conduit formed to provide a quadratically decreasing cross-sectional area along its length, for example shaped as a hollow cone, and secondly by having the discharge orifice leading from the conduit as an isosceles triangle extending the length of the cone with the apex of the orifice being disposed at the apex of the cone. When embodied in a headbox construction, the liquid enters horizontally at right angles to the paper machine direction through the open end of the cone. The center line of the triangular orifice is horizontal and is disposed at right angles to the paper machine direction. Thus the axis of the cone is at a slight angle to the entering flow. A triangular discharge slot in a quadratically decreasing or cone-shaped conduit as described provides a constant ratio of residual slot area to residual cross-section, no matter how far flow has advanced along the conduit. The result is a uniform velocity along the conduit and a uniform velocity discharge through the slot, excluding a correction for components of motion arising from inertia of the liquid.

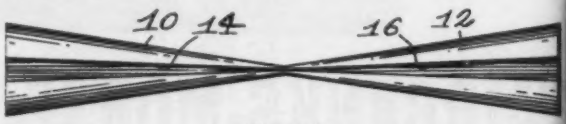


Figure 1

Figure 2

As shown in Figs. 1 and 2, the stock enters horizontally through the open base of cone 10 and discharges through triangular slot 14 which has a horizontal center line which will be disposed at right angles to the paper machine direction. At the same time stock enters horizontally from the opposite direction through the open base of cone 12 and discharges through slot 16. The slots 14 and 16 thus have their centers in a straight horizontal line and discharge in the same direction. As both slots discharge in the same plane, they cause no liquid torque, and thus cause no objectionable swirl.

Paperboard having a water-repellent coating

U. S. 2,970,932, issued Feb. 7, 1961 to Melvin C. Edlund and assigned to Fibreboard Paper Products Corp., provides a water-repellent paperboard product.

The paperboard has a discontinuous coating of organic siliconic acid polymer particles derived primarily from an organic siliconic acid that has a single organic radical attached to the silicon atom. Over this, there is a continuous coating of wax.

Bleaching of pulp

U.S. 2,963,395 issued Dec. 6, 1960 to Sangho Back, Delmer D. Hinrichs and James D. Wethern, assigned to Crown Zeller-

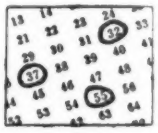
Continued on page 336

FOR FURTHER INFORMATION ON

- New Products
- New Literature
- Advertised products and services

Use this Return Card

To obtain further information quickly—and at no obligation—on any of the above items in this issue, circle the corresponding number on the attached card. We will forward your request promptly to the manufacturer, who will send the information directly to you.



*Requests from outside the United States must be placed in envelopes, stamped and addressed to: Readers' Service Dept.

The PAPER INDUSTRY
431 South Dearborn St.
Chicago 5, Ill., U. S. A.

AUGUST, 1961

NOTE: Card void after October 31, 1961

The PAPER INDUSTRY

Please have the manufacturers send me without obligation information or bulletins indicated by the numbers circled below.

Name ..... Title .....

Company Name ..... (Must be included)

Company Address .....

City ..... State .....
(If you prefer delivery at home, give home address, too)

Home Address .....

City ..... State .....

New Products and New Literature

1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22
23	24	25	26	27	28	29	30	31	32	33
34	35	36	37	38	39	40	41	42	43	44
45	46	47	48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63	64	65	66
67	68	69	70	71	72	73	74	75	76	77
78	79	80	81	82	83	84	85	86	87	88
89	90	91	92	93	94	95	96	97	98	99

Advertised Products and Services

101	102	103	104	105	106	107	108	109	110	111
112	113	114	115	116	117	118	119	120	121	122
123	124	125	126	127	128	129	130	131	132	133
134	135	136	137	138	139	140	141	142	143	144
145	146	147	148	149	150	151	152	153	154	155
156	157	158	159	160	161	162	163	164	165	166
167	168	169	170	171	172	173	174	175	176	177
178	179	180	181	182	183	184	185	186	187	188
189	190	191	192	193	194	195	196	197	198	199

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

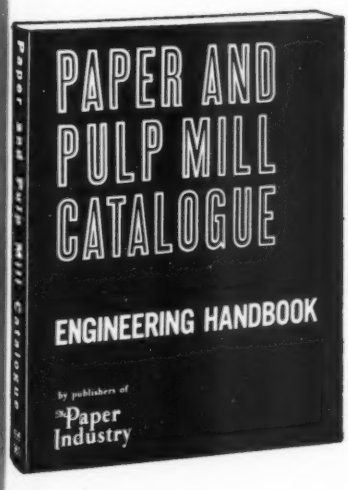
BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 1704 — CHICAGO, ILLINOIS

Readers' Service Dept.

***The* PAPER INDUSTRY**

431 South Dearborn St.

Chicago 5, Ill.



37TH EDITION

ON THE DESKS OF MEN WHO SPECIFY AND BUY IN . . .

Every operating paper and pulp mill in the United States and Canada

A one-volume, composite Catalogue or permanent classified Reference File of manufacturers' catalogues, a Buyers Service Section, and the Engineering Handbook. Published annually in September.

This book provides a quick, "easy to use and order from", all-inclusive service which eliminates searching through files for individual catalogues and engineering books.

(Continued on opposite side)

Postage Will be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO. 1704 — CHICAGO, ILLINOIS

Readers' Service Dept.

***The* PAPER INDUSTRY**

431 South Dearborn St.

Chicago 5, Ill.

AUGUST, 1961

NOTE: Card void after October 31, 1961

The PAPER INDUSTRY

Please have the manufacturers send me without obligation information or bulletins indicated by the numbers circled below.

Name.....Title.....

Company Name.....
(Must be included)

Company Address.....

City.....State.....
(If you prefer delivery at home, give home address, too)

Home Address.....

City.....State.....

New Products and New Literature

1	2	3	4	5	6	7	8	9	10	11
12	13	14	15	16	17	18	19	20	21	22
23	24	25	26	27	28	29	30	31	32	33
34	35	36	37	38	39	40	41	42	43	44
45	46	47	48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63	64	65	66
67	68	69	70	71	72	73	74	75	76	77
78	79	80	81	82	83	84	85	86	87	88
89	90	91	92	93	94	95	96	97	98	99

Advertised Products and Services

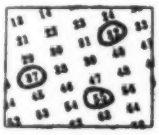
101	102	103	104	105	106	107	108	109	110	111
112	113	114	115	116	117	118	119	120	121	122
123	124	125	126	127	128	129	130	131	132	133
134	135	136	137	138	139	140	141	142	143	144
145	146	147	148	149	150	151	152	153	154	155
156	157	158	159	160	161	162	163	164	165	166
167	168	169	170	171	172	173	174	175	176	177
178	179	180	181	182	183	184	185	186	187	188
189	190	191	192	193	194	195	196	197	198	199

FOR FURTHER INFORMATION ON

- New Products
- New Literature
- Advertised products and services

Use this Return Card

To obtain further information quickly—and at no obligation—on any of the above items in this issue, circle the corresponding number on the attached card. We will forward your request promptly to the manufacturer, who will send the information directly to you.



*Requests from outside the United States must be placed in envelopes, stamped and addressed to: Readers' Service Dept.

The PAPER INDUSTRY
431 South Dearborn St.
Chicago 5, Ill., U. S. A.

OVER 500 PAGES OF INDISPENSABLE INFORMATION

CONTENTS:

- **Manufacturers Catalogue Section** — contains pages and complete inserts giving information and data on products of individual manufacturers. Pages appear in alphabetical order by names of manufacturers.
- **Buyers Service Section** — includes a comprehensive, cross-reference list of machinery, equipment, materials and chemicals with names of responsible manufacturers and suppliers; a list of trade names; complete addresses of all firms that are listed in the Section; and a directory of educational institutions in the United States and Canada having courses of instruction in the manufacture of pulp and paper.
- **Engineering Handbook Section** — a compilation of practical engineering data, formulas, graphs, charts, tables, etc., including a section dealing with uses and hazards of chemicals used in pulp and paper making. New material added yearly.

Paper and Pulp Mill Catalogue
is published by . . .

FRITZ PUBLICATIONS, INC.
431 South Dearborn Street
Chicago 5, Illinois

Further information on the various products described may be requested at no obligation through our Readers' Service Dept. Use the business reply card in this issue.

Graphite pumps

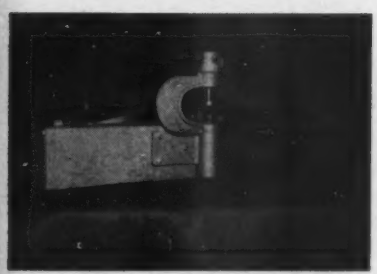
A new, compact frame-mounted pump has been added to this line of graphite pumps. The new pump uses the same wet end parts as the Type F pump and provides 1, 1½ and 2-in. discharge openings in a frame-mounted pump. — National Carbon Co.

Circle No. 1 on Readers' Service Card

Circular cutters

O-KNI-CO circular cutters are said to withstand long, continuous runs, and deliver dependable service in tough jobs. They are furnished with either single or double bevels, and are used in particular applications including slitting and cutting paper tubes, tissue felt and tape. — Ohio Knife Co.

Circle No. 2 on Readers' Service Card



Moisture meter

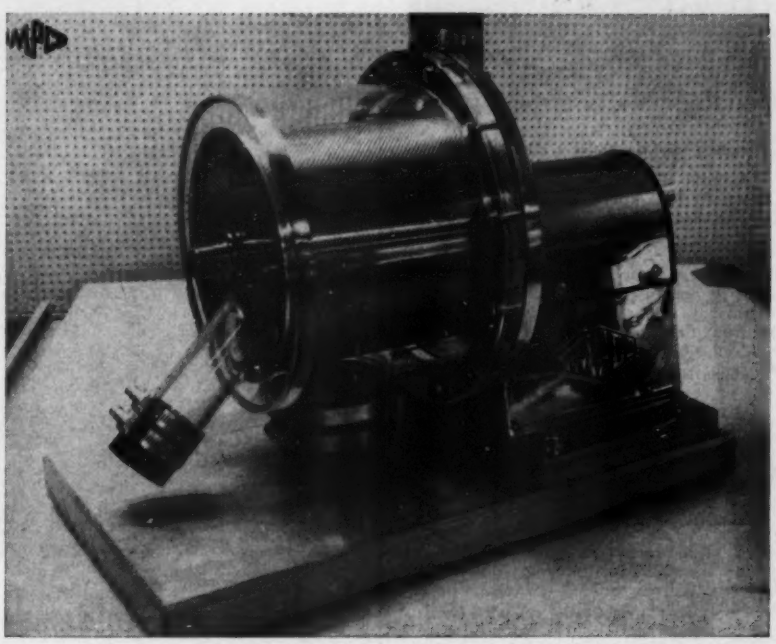
This moisture meter has been developed because of a trend towards the use of resin and plastic coatings as a moisture barrier in paper cartons. Through the use of an electrode, this meter determines the precise moisture of the paper fibres, ignoring the presence of polyethylene or other coatings on both sides or one side of the sheet. The electrode also makes automatic correction for any gradient with respect to moisture that may extend through the thickness of the sheet. — Hart-Moisture-Meters.

Circle No. 3 on Readers' Service Card

Pressure-vacuum control

A sensitive calibrated pressure-vacuum control for use on a wide variety of applications such as centrifuges, welding equipment, panelboards and process control equipment, is designed without an enclosure for direct incorporation into equipment. Several adjustable ranges are available within limits of 30 in. hg vac and 500 psi, with on-off differentials from 1.5 ± ½ in. hg to 10 ± 3 psi.—United Electric Controls Co.

Circle No. 4 on Readers' Service Card



Centrifugal screen

The A-1.0 centrifugal screen is designed specifically for laboratory use where sizeable batches of pulp are to be screened. It is suited for experimental pulping systems using a head tank for uniform feed where a pulp slurry of at least 50 lbs. of pulp has been diluted to the proper consistency.

This screen will handle through-put rates from approximately 2 tons per 24 hrs. of groundwood to 8 tons per day of linerboard softwood kraft. The feed consistency range varies from 0.5 to 1.5 per cent. A 3 hp, 1200 RPM motor is recommended and preferably some speed changing means. Six sets of various size screen plates are furnished—Improved Machinery Inc.

Circle No. 6 on Readers' Service Card

Pipe insulation

A multi-layer-type sectional pipe insulation, useable up to 1200°F. is composed of bonded felts of calcium silicate and asbestos fiber. Sections are said to be easy to cut and sawing creates virtually no dust. The multi-layers are crush-resistant under heavy loads. — Keasbey & Mattison Co.

Circle No. 5 on Readers' Service Card

Solid state regulators

A complete line of solid state regulators and exciters for variable speed drives, is now available. They use silicon controlled rectifiers and diodes in place of tubes, to achieve precise motor control. Transistors, capacitors and resistors are mounted on printed circuits, and each drive control system can be tailored to a specific job. — Reliance Electric & Eng. Co.

Circle No. 7 on Readers' Service Card

Insolubilized coatings

A new Behenamide, primarily in the C_{20} — C_{22} range, has indications of being an effective chemical building block to add water resistance in formulations for insolubilized paper coatings. — Humko Products, Chemical Div.

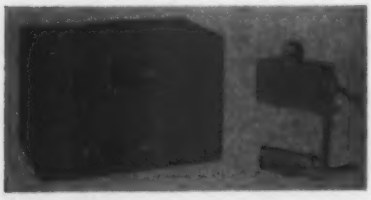
Circle No. 8 on Readers' Service Card

Insulated pipe ells

An aluminum jacket designed to protect and cover insulated pipe ells is

now available. It features a hump at the vertex of the bend which permits it to cover 109 combinations of pipe sizes and insulation thicknesses from a selection of 13 manufactured sizes. — General Aluminum Supply Co.

Circle No. 9 on Reader's Service Card



Photoelectric splice detector

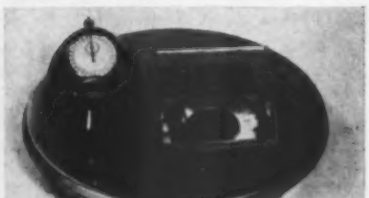
A new electronic device that reacts instantly to a splice in the web, is said to be ideal for use on any transparent or translucent webs and many webs that appear opaque. The detector is completely automatic, does not come into physical contact with the web, operates at any web speed and requires little maintenance. — Machine-O-Matic Inc.

Circle No. 10 on Reader's Service Card

Fiberglass expanding sleeve

A new expanding sleeve for use with the air shaft is made of custom laminated fiberglass and is used for coreless roll and narrow core operations. The sleeve is designed to fit any size shaft and comes in wall thicknesses of 1/16 in. to ½ in., depending on the load capacity. — Nim-Cor Inc.

Circle No. 11 on Reader's Service Card



Curl sizing tester

The new Carson curl sizing tester for testing the degree of curl and sizing of papers up to ten thousandths of an inch in thickness, features an improved timing system and a totally enclosed liquid container. The tester wets one end of a sheet of paper causing that side to expand and curl. Originally developed at the National Bureau of Standards, the tester is built to conform to TAPPI standard T-466 m-46. — Thwing-Albert Instrument Co.

Circle No. 12 on Reader's Service Card

Laboratory balance

This overhead beam type balance combines large capacity (2 kg) with high sensitivity (50 mg). An adjustable platform with suspension hook provides for specific gravity determinations. It is especially designed to provide maxi-

Continued on page 327

OUT-OF-SIGHT
Waste and Refuse Storage for Your Plant

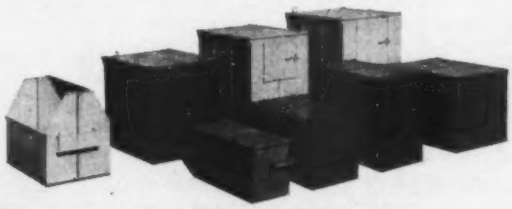
Plant-Owned System or Private Hauler Service Cuts Your Costs... Eliminates Unsightly Trash Piles

If trash piles, battered cans, scattered refuse, fire hazards and hit-or-miss collection are present in your plant, it may pay you to investigate the DEMPSTER-DUMPMASTER System.

You can own your own system or secure this vital service without capital outlay from one of the many Dumpmaster-equipped private haulers who operate in most major cities.

Clean, big-capacity containers, spotted at refuse accumulation points throughout your plant, provide enclosed, out-of-sight storage for waste and refuse, increasing plant cleanliness and improving employe morale.

Write today for a free brochure that describes this system and the name of your nearest private hauler.



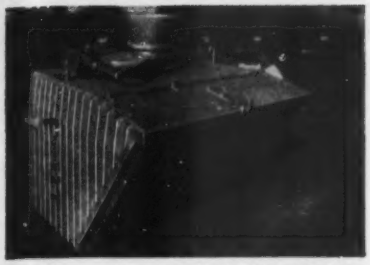
ONE OF THE DEMPSTER DUMPSTER® SYSTEMS

FREE BROCHURE
Write for Name of Your Nearest Private Hauler

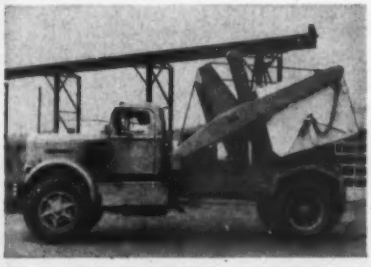
DEMPSTER BROTHERS Inc.
Dept. PI-8 KNOXVILLE 17, TENNESSEE

For more data circle 123 on Post Card

NEW PRODUCTS



CONTAINER FOR HOT MATERIALS
This 6 cu. yd. tilt-type container was specially built to store and handle a high-temperature dusty product. It has cooling fins, a counter-balanced spring-hinged lid and a 16" sliding gate valve. When full it is picked up, hauled and emptied by a Dempster-Dumpster. Details are contained in a free brochure entitled "Special Containers." Dempster Brothers, Inc., Knoxville 17, Tenn.



NEW LFW HANDLES CONTAINERS
This new LFW 603-C, mounted on a White Mustang, was produced to handle scrap metal storage containers. It will handle containers in capacities up to 15 cu. yds. in all Dempster-Dumpster models. Lifting capacity is 18,000 lbs. Dempster Brothers, Inc., Knoxville, Tenn., offers a catalog brief No. 160 describing this and other materials handling systems.

PORTABLE FUEL OIL TANKS
This 2,000-gallon tank was produced for operation at temperatures as low as −90° F. It features its own pump and gasoline engine. Prime mover is a truck-mounted Dempster-Dinosaur which hydraulically lifts the tank into carrying position and puts it off. A new catalog section No. 12 describes the development. Dempster Brothers, Inc., Knoxville 17, Tenn.

Advertisement

NEW PRODUCTS

Continued from page 326

mum stability and is equipped with spirit level and adjustable leveling feet. Knife edges are of case hardened steel. — Ohaus Scale Corp.

Circle No. 13 on Reader's Service Card

Rotary cut-off

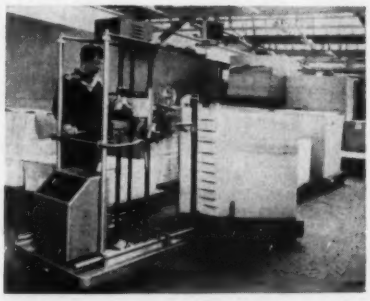
A new precision rotary cut-off offers a wide range of sheet cutting lengths for the paperboard industry. It can cut an endless web of corrugated or solid fibreboard, moving at speeds up to 650 fpm or more, into sheet lengths ranging from 25 to 240 in. Two different sheet lengths can be cut simultaneously. — S & S Corrugated Paper Machinery Co. Inc.

Circle No. 14 on Reader's Service Card

Skid packaging station

Production-line packaging of skids of paper has become possible with the development of a semi-automatic skid packaging station. The new system is built around a wrapping station, which pre-drapes the required number of wraps around the skid as it moves along the conveyor, and a strapping station, which incorporates a compression strapping machine and a skid notch feeding device. Wrapping is completed in about two min. — Signode Steel Strapping Co.

Circle No. 15 on Reader's Service Card



Paper stack counter

A new paper stack counter, the Mark VI, can count from the top of a 3 ft. 6 in. stack of paper on a skid down to the bottom piece while at the same time tabbing the paper at a programmed count. Fully mobile, the counter can be moved to any point in the bindery or paper mill for accurate counting and tabbing. — Crosfield Electronics Inc.

Circle No. 16 on Reader's Service Card

Glue spray kit

A new attachment for corrugated case sealing machines sprays adhesive on flaps, instead of customary glue roll application. Called the Huntingdon Spray Kit, the equipment is adaptable to existing case sealers with-

Continued on page 328

NOW—CHECK ACCURACY WHILE YOU CHECK MOISTURE!

New Electronic Moisture Registers have first "built-in standard" in a 3-second, portable moisture tester.

NOW DIAL ACCURACY IS ASSURED, even under the extremes of production-line use. With *self-checking standard*, Moisture Register's new Model 5's are checked and adjusted for calibration accuracy right on the job—by any untrained operator. He simply fits electrode to standard. Then with new trimmer he sets dial for perfect alignment. Gives calibration adjustment *in the field.* You get practical accuracy down to 0% ... 3-second spot tests for moisture wherever your product may be. Portable, light weight, battery operated, new rugged construction with miniature tube. Factory-set to your needs.

For faster testing of—

- Paper Stock
- Paperboard
- Insulation boards
- Paper Bags
- Plastics

SEND FOR NEW TECHNICAL DATA and information on 2-week free trial.

ELECTRONIC MOISTURE REGISTER Instruments

Moisture Register Company, Dept. PI
P. O. Box 910, Alhambra, California
Please send data on new Model 5's.

We are testing _____

in moisture range from _____% to _____%

Firm _____

By _____ Title _____

Address _____

City _____ State _____

For more data circle 124 on Post Card

NEW PRODUCTS

Continued from page 327

out disturbing original glue applicators and operates with either resin or dextrin adhesives. The kits are available in two-gun or four-gun units so that tops or bottoms can be sprayed separately or simultaneously. — Huntingdon Industries Inc.

Circle No. 17 on Reader's Service Card

Automatic broke remover

This all-automatic trimmer is equipped with a sliding front table to permit automatic removal of broke created by knife action. As the knife cuts the paper, the sliding table automatically creates an opening between the front table and the knife, permitting the broke to drop by gravity to the trim removal system. The manufacturer states that this permits increased production as the operator is relieved of manual handling of the broke. — Smith & Winchester Mfg. Co.

Circle No. 18 on Reader's Service Card

Pneumatic feeder

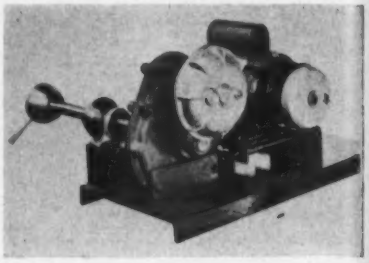
The new model NF-6-168 pneumatic conveyor feeder moves up to 30 tons per hour of bulk, granular material and assembly parts. It measures 16 ft. 8 in. in length, and has a 4 in. by 24 in. trough that can move bulk or granular material. The flow rate can be easily changed by adjusting the air pressure range from 20 to 70 psi. — National Air Vibrator Co.

Circle No. 19 on Reader's Service Card

Water-jet powered precipitator

Designated the type M Precipitator, the new clarifier is described as a sludge blanket type, in which the jet effect of water ejected from the tips of the agitator is the sole driving power required for the agitator unit. In operation, raw water and chemicals are premixed and introduced to the precipitator through an inlet at the center of the tank beneath the agitator tub. The general area of application of the new equipment is in the pretreatment of water for use in industrial plants. — Permutit Co.

Circle No. 20 on Reader's Service Card



Reel wynders and drives

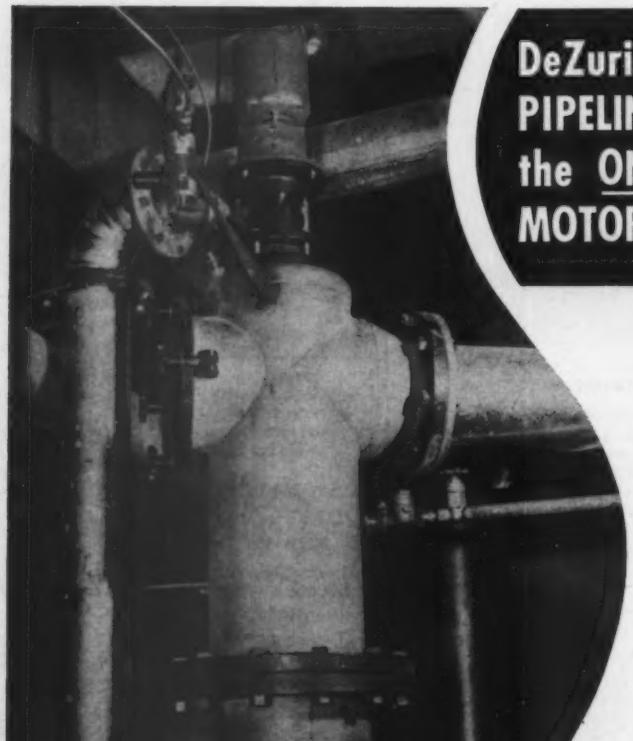
A line of reel-wynders and winder drives is designed to provide controlled tension for winding materials. Output ratings are from 1/16th through 3 hp with five standard sizes available to provide winding speeds from 3500 rpm through 3.5 rpm. Reel-wynders can be adapted to existing facilities. — Fluid Drive Eng. Co.

Circle No. 21 on Reader's Service Card

Plastic lining material

A new flexible and elastic corrosion resistant plastic sheet material has been introduced for lining tanks, ducts and other equipment made of steel, wood or concrete. It features resistance to abrasion and erosion, and has a

Continued on page 329



DeZurik's New
PIPELINE CONSISTENCY REGULATOR
the ONLY Compact Regulator with
MOTORIZED ROTATING SENSOR!

THE BIG DIFFERENCE . . . the BIG advantage . . . in the new DeZurik Compact Pipeline Regulator is in its "feeler" or sensing element. Only from DeZurik do you get DeZurik's fully-proved, motor-driven, rotating sensor. As a result you DON'T get fouling; you DON'T get stock hang-up even on the stringiest stock. No downtime, no failures.

You DO get remarkable accuracy, holding consistency at the amazing level of plus-or-minus .1% or less. All this performance is in a unit that installs right on the pipe, needs no extra space, no extra supports. It operates and records around the clock; stays on the job around the calendar with virtually no maintenance.

COMPLETE DATA AND COSTS ON REQUEST.

DeZURIK CORPORATION
SARTELL, MINNESOTA

For more data circle 125 on Post Card

PHOTOVOLT

Standard Laboratory pH Meter 115

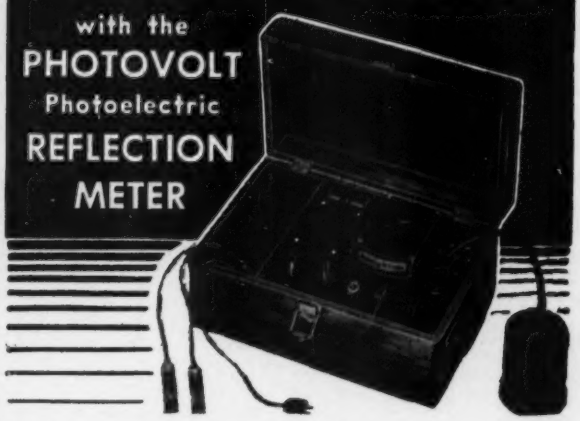
$175 including Electrodes

WRITE FOR BULLETIN No. 225

A full-fledged pH Meter of remarkable accuracy and stability — simple in operation and maintenance — fast and dependable in service.

PHOTOVOLT CORP.
1115 BROADWAY • NEW YORK 10, N. Y.

You Can Be Sure!
with the PHOTOVOLT Photoelectric REFLECTION METER



for accurate measurement of
Brightness and Opacity
of pulp and paper in terms of TAPPI specifications.
Also for *Gloss and Color*
tests on paper, card board, and other paper products.
Portable, reliable, rugged, simple to operate
Also: Colorimeters, pH Meters

PHOTOVOLT CORP.
1115 BROADWAY NEW YORK 10, N. Y.

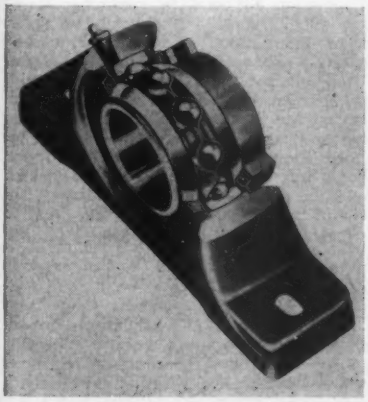
For more data circle 126 on Post Card

NEW PRODUCTS

Continued from page 328

polished surface which facilitates solution flow. — Joseph T. Ryerson & Son Inc.

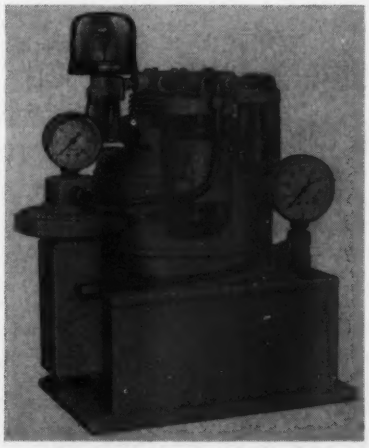
Circle No. 22 on Reader's Service Card



Pillow blocks

A new series of heavy duty ball bearing pillow blocks equipped with self-aligning, single row, deep-groove, precision ball bearings which conform to basic standards of the AFBMA, is now available. They come in a complete range of shaft sizes from 5/8 to 4 in. — Link-Belt Co.

Circle No. 23 on Reader's Service Card



Web guide

The new model PH-55 hydraulic web guide with automatic pilot control is said to be designed for greater speed, accuracy and economy in processing paper and other web materials. The PH-55 features pin-point precision through a straight forward design, making possible positive web correc-

Continued on page 330

COMPLETE SERVICE

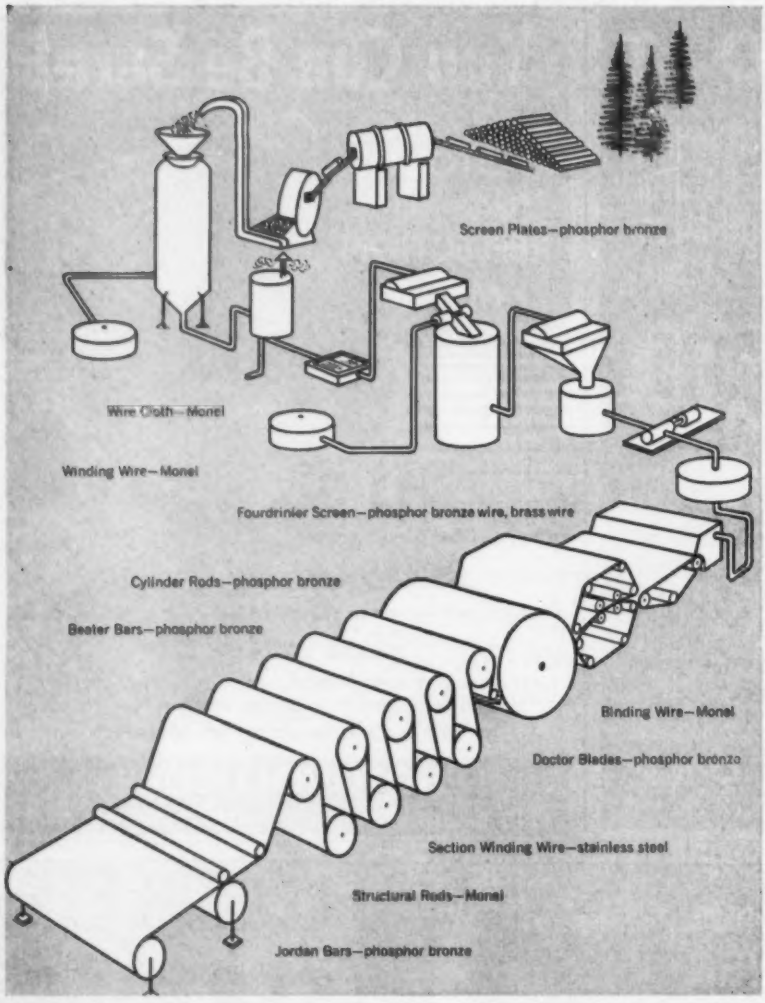
- Design
- Construction
- Maintenance

LININGS AND TILE TANKS

STEBBINS
ENGINEERING AND MANUFACTURING CO.
Watertown, N. Y.

PENSACOLA, SEATTLE, MONTREAL, VANCOUVER

For more data circle 127 on Post Card



Why most paper is screened, beaten, dried, doctored and formed on Porter alloys

For exceptional resistance to wear and corrosion, count on Porter to supply the *right* alloy for critical paper machinery components. For Jordan Bars, Doctor Blades and other vital paper machinery equipment, Porter alloys have unmatched strength and durability—feature exceptional machineability and reworking characteristics, and will not discolor paper pulp.

Long known to the industry as the world's largest producer of phosphor bronze Fourdrinier wire, Porter is also your *single reliable source* for a wide range of special alloys in 8 basic groups of wire, rod and strip . . . phosphor bronze, nickel silver, cupro nickel, brass, stainless steel, nickel, Monel and Inconel.

Ask for a free copy of "Alloys for Industry" describing these alloys. Write H. K. Porter Company, Inc., Riverside-Alloy Metal Division, Riverside, N. J. Or check the Yellow Pages for our nearest sales office. Where there's paper made—there's Porter.

PORTER **RIVERSIDE-ALLOY METAL DIVISION**
H. K. PORTER COMPANY, INC.

For more data circle 128 on Post Card

NEW PRODUCTS

Continued from page 329

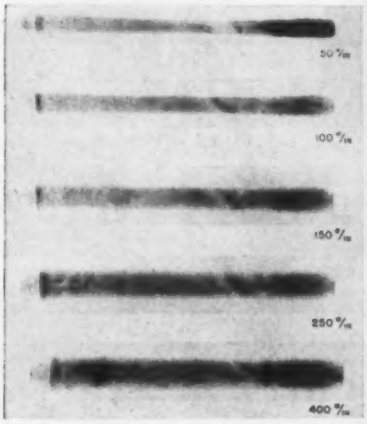
tions to within plus or minus .010 in. Vacuum, pressure, mechanical and photo-cell web positioning sensing heads are all available with the adjustable sensing head bracket. — Stanford Eng. Co.

Circle No. 24 on Reader's Service Card

Air-drying water repellents

Two new durable air-drying silicone water repellents for use on paper, are now available. The first, SS-4053, is for industrial application and is designed for use where a material containing a non-inflammable solvent is needed. SS-4029 is suggested for consumer applications. — General Electric.

Circle No. 25 on Reader's Service Card



Nip and crown roll tester

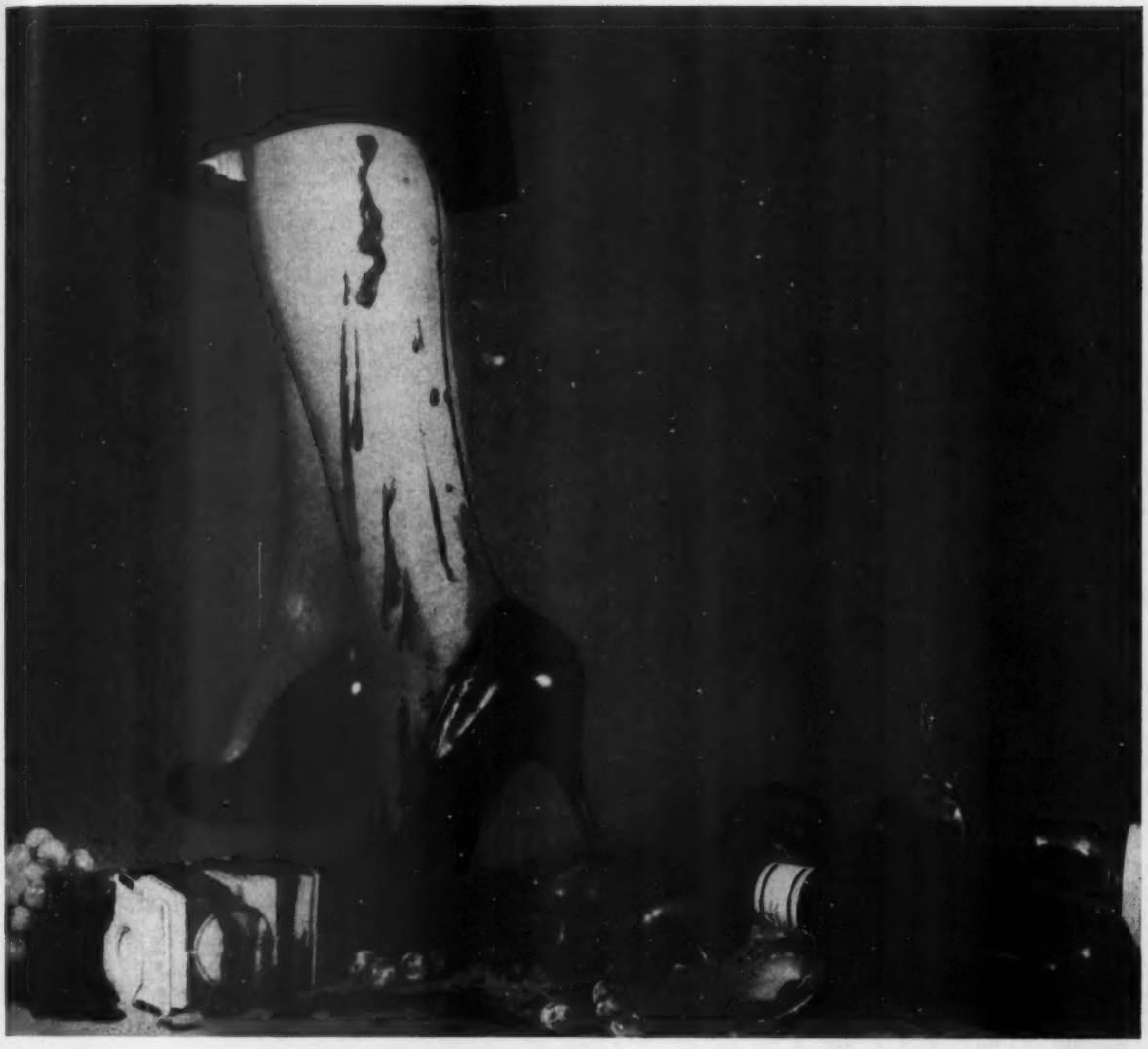
This test set is made up of 200 ft. of a specially developed carbon paper together with 200 ft. of white master sheet to be inserted in a shipping-dispensing carton with a serrated tearing edge. Included in the kit are complete instructions and a booklet discussing nips and crowns and other related information of value to the mill superintendent. This new unit is said to provide a completely accurate record at pressures of less than 50 lbs. to more than 1500 lbs. per lineal inch. Photo above shows sheet after test has been made. — Manhattan Rubber Division of Raybestos-Manhattan Inc.

Circle No. 26 on Reader's Service Card

Static drives

Static, regulated adjustable-speed drives, which operate from a-c power source, are used to drive machinery which makes single- and double-faced corrugated board sheets. The Reactifier drives replace the AV-type drive which used a-c to d-c m-g sets to power d-c motors. On the drives, the conversion from a-c to d-c is done by saturable core reactors and silicon rectifiers. — Westinghouse Electric Corp.

Circle No. 27 on Reader's Service Card



BAG PASTING PROBLEMS? *See Penick & Ford!*

The break-through nobody wants—when bag seams loosen and groceries obey Newton's law! Weak bags are bad for everybody's business. □ For 25 years now Penick & Ford has been working in the laboratory and the field to prevent just such accidents. As a result we have developed formulas and processes for adhesives suitable for every type of paper and all kinds of machinery. Of special interest are three patented processes* originated by Penick & Ford for making waterproof adhesives in your own plant—and for the same purpose, our new Tri-Con Process involving a 3-way condensation among starch, polyvinyl alcohol and a starch-condensing resin. In addition we offer: ❶ Efficient, economical, complete dry adhesives—regular, waterproof and layflat types. ❷ Base starch materials, formulas and technical help if you compound your own adhesives. ❸ Engineering service in designing and laying out equipment. **Why wait for trouble? Get in touch with Penick & Ford today!**

*U. S. PATENT NO. 2,450,377
STARCH-RESIN REACTION PRODUCT AND METHOD OF PRODUCING SAME
U. S. PATENT NO. 2,626,934
ALKALINE-SETTING RESIN ADHESIVE AND METHOD OF MAKING SAME
U. S. PATENT NO. 2,650,205
ALKALINE-SETTING RESIN-STARCH REACTION PRODUCT AND METHODS OF PREPARATION THEREOF

Penick & Ford

PENICK & FORD, LTD.
INCORPORATED

750 THIRD AVENUE, NEW YORK 17, N. Y. • 1531 MARIETTA BOULEVARD, ATLANTA, GA. • CEDAR RAPIDS, IOWA • 333 MARKET STREET, SAN FRANCISCO 5, CALIF

For more data circle 129 on Post Card

on more and more paper machines — it's SURFACE-WIND REELS by...

available with CENTER WIND ATTACHMENT

VALLEY IRON WORKS CORPORATION

APPLETON, WISCONSIN

a subsidiary of Allis-Chalmers Manufacturing Company

West Coast Representative: E. A. Berry, P. O. Box 958, Longview, Washington
Canadian Representative: Pulp and Paper Mill Accessories, Ltd., P.O. Box 850, Saint Laurent, Montreal 9, P.Q., Canada

VALLEY

For more data circle 130 on Post Card

Books

WATER PURITY, by Earl Finbar Murphy, Associate Professor of Law, Temple University School of Law. Published by University of Wisconsin Press, 430 Sterling Ct., Madison 6, Wis. 212 pp. Price: $4.75.

The author has written a serious account of the historical development of the control of water pollution. He begins with the theoretical solutions to the problem offered by Bentham in England and traces the increasing need for water purity as nineteenth and twentieth century industries and municipalities poured out wastes into the water supply. He brings the story to its conclusion by discussing the administrative and legal controls currently in force in the United States. The author's style is both entertaining and instructive.

A LABORATORY HANDBOOK OF PULP AND PAPER MANUFACTURE, by Julius Grant, Chemical Consultant. Published by Edward Arnold (Publishers) Ltd., and St. Martin's Press Inc., 175 Fifth Ave., New York 10, N.Y. 523 pp. Price: $17.50.

This book incorporates the fourth edition of Stevens' "Paper Mill Chemist". Since many new processes in the manufacture of paper have occurred in the last 20 years, the author has attempted to incorporate the material of the first edition of his book with Stevens' work and modern methods. References to the original literature have been brought up to date and full recognition given to work emanating from countries other than Great Britain.

Booklets

SIMPLIFIED PRACTICE RECOMMENDATION R252-60 for Ice Cream Cartons and Molds, is the second edition of this booklet available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C.

DIRECTORY OF FORK LIFT TRUCKS AND STRADDLE CARRIERS is available from the Food and Agriculture Organization of the United Nations. It is published in both Italian and English.

USDA Reports

STATION PAPER NO. 121, Forced Air-Drying of Southern Pine Lumber, by L. I. Gaby, is now available from the Southeastern Forest Experiment Station, Asheville, N.C. Test procedures, results and analysis, and conclusions are given together with charts and drawings to illustrate the experiment.

AVAILABLE from the Southeastern Forest Experiment Station, Asheville, N.C., is Station Paper No. 122, A Method of Appraising Pine Sawtimber in South Carolina, by Walter C. Anderson. This is mainly for the small landowner who occasionally sells small lots of timber.

Manufacturers' Publications

Copies of these publications are available at no obligation through our Readers' Service Department. Use the reply card which accompanies this issue when requesting items.

Polyolefins

Eastman Chemical Products Inc. is offering a bulletin on Epolene C-10 polyolefins for paper coating. The booklet tells the properties of the product, application techniques and preparation of hot melts.

Circle No. 28 on Readers' Service Card

Bonnetless knife gate valve

DeZurik Corp. has published a bulletin on their re-designed bonnetless knife gate valve. The bulletin is illustrated and lists accessories, new features and applications.

Circle No. 29 on Readers' Service Card

Automatic belt cleaning system

Sellers Injector Corp. is offering Bulletin 448 on the company's new automatic belt cleaning system. The four-page bulletin outlines benefits of the new system and helps the engineer plan an installation by illustrating the equipment installed in a typical processing plant. Photographs show the arrangement of system components. Specifications listed include nozzle pressures, water and steam pressure requirements. Piping requirements are also given.

Circle No. 30 on Readers' Service Card

Rotary sheeter

Smith & Winchester Mfg. Co. is offering a bulletin on the "Pre-Hi" Sheeter, and its features. Standard sizes are given for machine size and web width.

Circle No. 31 on Readers' Service Card

Hydroscillator units

Ross Midwest Fulton Division of Midland-Ross Corp. is making available a four-page bulletin describing their Hydroscillator units for the paper industry. The bulletin describes how the flexible units eliminate mill roll wrinkles at the winder, and includes photos, descriptions, specifications, drawings and operational data on the models available.

Circle No. 32 on Readers' Service Card

Turbine pumps

Roy E. Roth Co. has published a bulletin on the complete engineering information for their regenerative turbine pumps. The information covers a factual comparison and discussion of the differences of the regenerative centrifugal turbine as opposed to the conventional centrifugal pump and gives complete selection, performance and mechanical data plus installation dimension.

Circle No. 33 on Readers' Service Card

Converting equipment

Dilts Division of Black-Clawson Co. Inc., is offering a bulletin which illustrates their newest line of converting equipment. Information is given on coaters, coating auxiliaries, pilot plant and special coaters, extrusion coating, slitter-rewinders, unwinds, surface winder, center winders, printing presses, embossers, auxiliary equipment, laminators, and cooling and drying drums.

Circle No. 34 on Readers' Service Card

Electrical machinery

Fairbanks Morse & Co. is offering a revised 48-page "Catechism of Electrical Machinery" which presents in a simple form the most important theoretical and practical features of the common types of direct-current and alternating-current motors, generators and control equipment. The text is profusely illustrated with electrical rotating machines and allied equipment.

Circle No. 35 on Readers' Service Card

Ply bond strength

Testing Machines Inc. is offering a data sheet illustrating and describing the ply bond tester of paperboard. This specification sheet includes illustrations of the sample and disc assembly during a test, plus information on the various units comprising the apparatus of the test.

Circle No. 36 on Readers' Service Card

Automatic taper

S & S Corrugated Paper Machinery Co. is offering an engineering data sheet covering construction and operation of the company's automatic taper. Complete specifications covering the range of blank and panel sizes are shown.

Circle No. 37 on Readers' Service Card

Centri-cleaners

Bauer Bros. Co. is offering a revised bulletin on centri-cleaners. It outlines typical applications for both cleaners and contains information on ceramic cones and bell type overflow nozzles for both units, as well as pertinent operating and installation data.

Circle No. 38 on Readers' Service Card

Steam traps

Stickle Steam Specialties Co. is offering a bulletin on steam traps for medium and high pressures. It gives a detailed description of features, along with data on pressures, sizes, capacities, dimensions, and prices of each model.

Circle No. 39 on Readers' Service Card

Suction box control

Fischer & Porter Co. is offering a new publication on suction box and couch roll vacuum control. The bulletin cites the benefits of precise control and lists the company's instrumentation that comprises a system to

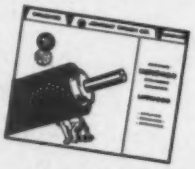
The BRUSH with the Engineering Background

If you use brushes, or have a brushing problem, it makes good sense to consult brush engineers . . . brush experts. We learned nine good reasons why, in nearly a century of engineering brushes for industry.

1. There is no standard "fits-all" brush.
2. There is no best bristling material.
3. Synthetics are excellent for many brushes, but traditional materials still account for more than half the brushes we make.
4. Our customers will not permit us to compromise quality, regardless of cost. They want the right materials for their purpose, which incidentally, are not always the most expensive.
5. Like brush applications do not necessarily require like brushes.
6. Our customers' problems are our problems.
7. Close attention should be given to detail.
8. Leading machine builders rely on Jenkins' engineering know-how to solve important brush problems.
9. Experience is invaluable, but it alone cannot be relied on to solve many brushing problems.

For these reasons, we have established a brush laboratory which has contributed to many highly successful brushing systems. All Jenkins' engineering consultations and laboratory work are conducted without cost or obligation.

Learn more about the wide range of Jenkins' Brush sizes and uses . . . send for new catalog designed to aid brush selection.



Specify Jenkins'

METLKOR®

the original . . . the best Metal Core Brush

and **LIFEWOOD®**

Wood Backed Brushes

M. W. JENKINS' SONS, INC.

Serving Industry For Almost 100 Years

1042 Pompton Ave., Cedar Grove

Essex County, N.J. • CEnter 9-5150

For more data circle 131 on Post Card

provide such control. The bulletin includes a drawing of the seal box, suction boxes, couch roll and wire, showing how the system is incorporated.

Circle No. 40 on Reader's Service Card

Controllers

Minneapolis-Honeywell Regulator Co. has published a 56-page catalog which covers the complete line of Electronik controllers, both pneumatic and electric. This detailed, highly illustrated catalog covers modular design features as well as the new proportional plus reset plus rate control units, partial chart listing, and pneumatic and electric contact control forms.

Circle No. 41 on Reader's Service Card

Heat transfer applications

Tranter Mfg. Inc. has released a four-page brochure describing a variety of pulp and paper heat transfer applications performed by "Platecoil" units. Pictures and drawings illustrate the units' adaptability to be formed and fabricated into diverse sizes and shapes from weldable metals.

Circle No. 42 on Reader's Service Card

Auto-flex syphon

Ross Midwest Fulton Division of Midland-Ross Corp. is making available a four-page brochure describing the "auto-flex syphon" and "ball sight-flow indicators" for paper machines. It describes and illustrates the products with both data and photos.

Circle No. 43 on Reader's Service Card

Belting maintenance wall chart

Hewitt-Robins is offering a wall chart pointing out various ways to cut down on costly wear and tear of conveyor belting through proper maintenance procedures. A brief description of the composition of belting is provided, with a sketch. Choice of the proper belt for the application is pointed out for the pulp and paper industries.

Circle No. 44 on Reader's Service Card

Split-body control valves

Conoflow Corp. has just issued a new bulletin describing the company's complete line of Series LB all-purpose, split-body control valves. This 16-page booklet gives details on construction and operation of the single-seated, valve, as well as complete specifications, ordering information and valve sizing formulae.

Circle No. 45 on Reader's Service Card

Gluing manual

The Packaging Institute is offering a manual which summarizes the types, properties, handling, storage problems and testing of adhesives, as well as the types, properties and storage of boards. This 41-page booklet is a handy reference for all who are concerned with the side seaming and closure of cartons.

Circle No. 46 on Reader's Service Card

Equipment for process industries

Fuller Co. has published a new 12-page, 2-color bulletin describing their major product lines for the chemical processing industries. Thirteen photos and seventeen drawings illustrate design features and typical installations.

Circle No. 47 on Reader's Service Card

Paper rolls

Mount Hope Machinery Co. is offering in a 12-page booklet: "The Principles of the Mount Hope Roll". Liberally-designed and illustrated with 25 drawings, the booklet is meant to serve as an easily-understood operating manual.

Circle No. 48 on Reader's Service Card

Professional and Business Services

Engineering for the PULP and PAPER INDUSTRY

Help Wanted Male

PRODUCTION — SALES SUPERVISOR

New England Box Board Mill is seeking an experienced man to sell and supervise out put of converting plant. Must have knowledge of board to foil laminating. Must have knowledge of trade and develop new products. Write Box 715, The PAPER INDUSTRY.

Tertiary amine

Onyx Chemical Corp. is announcing the publication of its revised bulletin on Onamine RO, a strongly cationic cyclic tertiary amine. The four-page bulletin includes information on application, use and handling.

Circle No. 49 on Reader's Service Card

Air pollution control

Research-Cottrell Inc. has published the latest techniques and equipment for air pollution control in a new 12-page, illustrated brochure. Research, laboratory, testing and service facilities available to customers are also listed and described.

Circle No. 50 on Reader's Service Card

Testing instruments

Gardner Laboratory Inc. is offering a new bulletin listing the optical as well as the physical test instruments manufactured by the company.

Circle No. 51 on Reader's Service Card

Physical testing machines

Testing Machines Inc. has published an eight-page comprehensive listing of 1239 physical testing machines for all industries. It is said to be the most comprehensive list available from one source.

Circle No. 52 on Reader's Service Card

CLASSIFIED ADVERTISING

ANY SPARE TIME?

Make your paper mill knowledge add to your income. No selling. Confidential. Write Box 710, The Paper Industry.

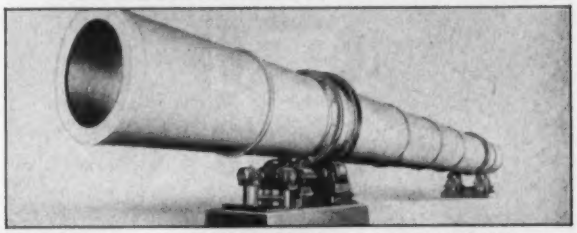
ADHESIVES in the PAPER INDUSTRY
Compiled and edited by A. W. J. Dyck, Ph.D.
Price $2.00 prepaid with order
Published by FRITZ PUBLICATIONS, INC.
431 S. Dearborn Street, Chicago 5, Illinois

Ten Publications for Papermakers

Pulp and Paper (Casey)	
Vol. I, Pulping and Bleaching	**$19.50**
Vol. II, Papermaking	**25.00**
Vol. III, Paper Testing and Converting	**29.50**
Paper and Paperboard Making (Williamson)	**6.00**
Adhesives in the Paper Industry	**2.00**
Lessons in Papermaking—Part 1 (Williamson)	**1.50**
Lessons in Papermaking—Part 2 (Williamson)	**1.50**
Notes and Observations on Beaters	**1.00**
Trouble on the Paper Machine	**.75**
Lubricants and Lubrication Equipment in the Pulp and Paper Industry	**.50**

Mail your order with payment to:
***The* PAPER INDUSTRY**
431 S. Dearborn Street, Chicago 5, Illinois

THE KILN OF TOMORROW . . . TODAY
DESIGNED AND BUILT BY: VULCAN
THE OLDEST NAME IN ROTARY KILNS



SIMPLE . . . ECONOMICAL . . . RUGGED . . .

HERE ARE THE NEW PATENTED FEATURES:

NEW . . . self aligning trunnion rollers
NEW . . . constant thrust load control
NEW . . . integration of girth gear and riding ring
NEW . . . application of anti-friction roller bearings

Vulcan's new kiln in your operation will simplify your foundation plans, lower cost of erection, decrease maintenance costs, and cut down-time . . . Write today for more information.

111 YEARS OF KILN EXPERIENCE

VULCAN IRON WORKS, INC.
WILKES-BARRE, PA.—CABLE ADDRESS: VULWORKS
COOLERS—DRYERS—RETORTS—CALCINERS—SUGAR MILLS—SHEAVES
VERTICAL LIME KILNS—STEEL CASTINGS—GEARS TO 24" DIA.

For more data circle 132 on Post Card

Replacement Screen Cylinders

to fit: SHARTLE - 24P Selectifier Screen

1. Completely interchangeable with your present screen plates.
2. Manufactured in all standard Shartle hole diameters and gauges of material.
3. Available in Type 316 Stainless Steel, Monel and Inconel.
4. Sold directly from the manufacturer through your Morey Paper Mill Supply sales representative.

Liberal discount by exchanging your old cylinders complete with rings.

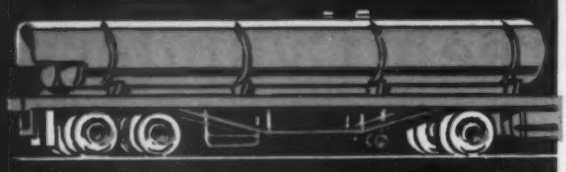
Write for descriptive material. Dept. SP

NATIONAL PERFORATING CORP.
SUBSIDIARY OF FITCHBURG SCREEN PLATE CO.
301 SOUTH STREET, FITCHBURG, MASSACHUSETTS

For more data circle 133 on Post Card

LIQUID
SO_2

WE ARE BASIC PRODUCERS OF SULFUR CHEMICALS



Our basic position enables us to control the PURITY of our Sulfur Dioxide from the raw materials we mine to the finished product we deliver to you.

Available in:

- Tank Cars
- Tank Trucks
- Ton Drums
- Cylinders

To the Pulp Industry we offer a dependable source of highest purity Sulfur Dioxide.

For further information Phone JAckson 3-5024 or Write.

TENNESSEE CORPORATION

For more data circle 134 on Post Card

PATENTS

Continued from page 324

bach Corp., describes a continuous process of bleaching lignocellulosic pulp.

The process consists of feeding into an air-tight vessel a semi-solid, non-flowable moist mass of pulp in particulate form, removing substantially all of the air from the vessel, forming a mixture of the pulp and a reducing bleaching agent consisting of a stabilized aqueous solution of zinc hydrosulfite at 100 to 230°F., at a pH of 4 to 8.

Recovery of chemicals from pulp residual liquor

U.S. 2,967,758, issued Jan. 10, 1961 to Benjamin N. Thorson and assigned to Babcock & Wilcox Co., describes an apparatus for disintegrating and dispersing a molten smelt stream prior to its delivery to a pool of liquid in a dissolving tank so as to avoid violent chemical reactions in the dissolving tank.

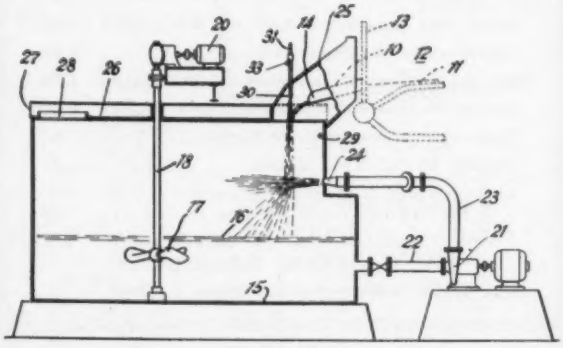


Figure 3

According to the invention, dissolving tank noise has been largely eliminated by the use of a high velocity gaseous fluid jet, preferably steam under a substantial pressure, which is directed downwardly to intercept the stream of molten smelt entering the dissolving tank so as to shatter the stream and disperse the smelt particles before the molten smelt encounters the pool of weak liquor in the tank. The downward direction of the smelt disintegrating jet drives the smelt particles towards the pool and during this travel the smelt particles are preferably quenched by a spray of weak liquor recirculated from the pool.

The method is illustrated in Fig. 3.

Other Patents of Interest

Subject	Inventor or Assignee	Patent No.	Date
Continuous digestion apparatus	Pandia, Inc.	2,963,086	12/6/60
Band type can carrier	Container Corp. of America	2,963,198	"
Dispensing container	American Can Co.	2,963,209	"
Container with rigidizing corner structure	John E. Gillmore	2,963,210	"
Self-locking container with multi-ply wall construction	Container Corp. of America	2,963,211	"
Tabs and notches on self-erecting box	Frank A. Gastright	2,963,212	"
Carton	Diamond National Corp.	2,963,213	"
Cartons with replaceable end closures	New Haven Board & Carton Co.	2,963,214	12/6/60
Production of quality controlled pulp molded articles	Plessey Co. Ltd.	2,963,397	"
Cardboard box	Morton Goldsholl	2,964,227	12/13/60
Box construction	United States Automatic Box Machinery Co. Inc.	2,964,228	"
Open-ended carton	Old Dominion Box Co. Inc.	2,964,229	"
Dividers for boxes	Baljak Corp.	2,964,230	"
Longitudinal side opening carton	Michigan Carton Co.	2,964,231	"
Impregnating paper to form laminated material	Th. Goldschmidt A. G.	2,964,426	"
Method of processing lignified cellulose	Alfred M. Thomsen	2,964,449	"

RAGS (Domestic)

New Cotton Cuttings

The following are brokers' and large dealers' average buying prices for sizeable lots in cents per pound f.o.b. New York:

	per cwt
No. 1 white shirt cuttings	10.00— 10.50
Soft unbleached muslins	13.50— 14.00
Fancy shirt cuttings	2.00— 3.00
No. 1 percales	4.00— 5.00
No. 1 washables	2.00— 2.25
No. 1 light silesias	6 50— 7.00
Light flannelettes	5.50— 6.00
Cottonades	2.25— 2.50
Blue overall cuttings	5.00— 5.50
Blue cheviots	6.75— 7.25
Canton flannels, bleached	9.00— 10.00
Canton flannels, unbleached	10.50— 11.00
Osnaburg cuttings	8.50— 9.00
Underwear cuts, bleached	10.50— 11.00
Underwear cuts, unbleached	10.50— 11.00
Sun tan khaki cuttings	5.00— 5.50

Cotton Rags

The following are prices, cents per pound, paid by dealers and brokers f.o.b. New York.

	per cwt.
No. 1 roofing (Chicago)	.65— .70
No. 2 roofing (Chicago)	.55— .60
Twos and blues, repacked	2.00— 2.25
Thirds and blues, repacked	1.50— 1.75

WASTE PAPER

The following are prices, dollars per net ton, paid by brokers and large dealers for carload quantities of baled stock, f.o.b. cars New York:

No. 1 hard white envelope cuttings	85.00— 90.00
No. 1 hard white shavings	70.00— 75.00
No. 1 soft white shavings	45.00— 50.00
Soft white shavings, uncoated	55.00— 60.00
Fly leaf shavings No. 1	17.00— 22.00
Fly leaf, woody, No. 1	17.00— 20.00
Mixed colored shavings	16.00— 18.00
No. 1 books and magazines	13.00— 15.00
Ledger stock, white, No. 1	40.00— 45.00
Ledger stock colored, No. 1 (Midwest ship)	27.50— 30.00
New manila envelope cuttings (free of groundwood)	50.00— 55.00
New manila envelope cuttings (containing groundwood)	40.00— 45.00
Manila tab cards	50.00— 55.00
Colored tab cards	40.00— 42.50
New northern kraft envelope cuttings	50.00— 55.00
Triple sorted kraft, 100%	30.00— 32.50
No. 1 old kraft	22.50—
White news cuts, No. 1	40.00— 45.00
No. 1 overissue news	17.00— 19.00
Folded news, special	13.00— 14.00
Folded news, ordinary	11.00— 12.00
Old corrugated boxes	19.00— 20.00
New jute corrugated cuts	19.00— 20.00
Mill wrappers	9.00— 11.00
Boxboard cuttings	6.00— 8.00
No. 1 mixed paper	3.00— 8.00

CHEMICALS

F.o.b. New York City

Alum, ammonium	
Granular, bags, works, cwt.	4.80—
Lump, drums, works, cwt.	5.55—
Powdered, drums, works, cwt.	5.70—
1-Arginine, drums, kilo	60.00—
Blanc Fixe	
Direct process, bags, c.l., works, ton	160.00—
L. c. l., ton	170.00—
Casein, domestic acid precipitated	
30-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.56—
80-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.64—
Imported, 30M Argentine, ex-dock, c. l., lb.	.18¾—
30M N.Z. Lactic, ex-dock, c. l., lb.	.25—
China Clay, domestic dry-ground, airfloat, 99%	
325-mesh bags, c.l., Georgia works, ton	11.00— 17.00
300-mesh bags, c.l., Georgia works, ton	13.50— 22.50
Imported, white, lump, bulk, c. l., ex dock Phila, Portland, Me., gross ton	23.00— 35.00
Chlorine, liquid	
Tanks, single units, works, freight equaled, cwt.	3.25—
Glycerine, refined (CP, USP) 99% drums c. l., delivered lb.	.26¾—
Litharge, commercial powdered	
Barrels, c. l., works, freight equaled lb.	.13¼—
Rosin, gum, c. l., f.o.b. New York, cwt.	
K, M	12.75—
N	12.85—
WG	12.95—
WW	13.00—
Rosin, wood, c. l., f.o.b., shipping point, cwt.	
K, M.	11.00— 12.25
N	11.25— 12.35
WG	11.50— 12.55
WW	11.75— 12.85
Saltcake, domestic, bulk works, 100% Na_2SO_4 basis ton	28.00—
Soda Ash	
Dense, 58%, paper bags, c.l. works, cwt	1.90—
Light, 58%, paper bags, c.l. works, cwt	1.85—
Soda, caustic	
Flake, 76%, drums, c. l. works, freight equalled, cwt	5.20—
Solid, 76%, drums, c. l. works, cwt.	4.80—
Sodium Silicate	
40°Be, 1:3.2, turbid, drums, c. l., works, cwt.	1.65—
52°Be, turbid, 1:2.4, drums, c. l., works, cwt.	2.65—
Starch	
Pearl, 140-lb. bags, cwt.	6.73—
Pearl, 100-lb. bags, cwt.	6.58—
Powdered, 100-lb. paper bags, cwt.	6.78—
Sulfur, crude	
Bulk, c. l. mine, contract, long ton	23.50—
Talc	
Domestic, fibrous, N. Y., grd., bags, c. l. works, ton	28.00—
Canadian, ground, bags, c. l. works, ton	20.00— 35.00
Titanium Pigment	
Calcium-rutile base, regular, bags, c. l., lb.	.09⅜—
High-tinting, drums, c. l., lb	.14⅜—
Zinc Oxide Pigment, American process	
Lead-free, bags, c. l. freight allowed, lb	.12½—
Leaded, 35%, bags, c. l., freight allowed, lb.	.14—

WOOD PULP

Quotations on domestic and Canadian pulp, dollars per short air-dry ton delivered consuming mills including basic allowances, follow:

Bleached sulfite, No. 1	140.00—
Bleached sulfite, Canadian	140.00—
Unbleached sulfite, Canadian	125.00—
Bleached soda	130.00—135.00
Bleached soda, Canadian	130.00—135.00
Kraft, bleached hardwood	135.00—140.00
Kraft, bleached	145.00—150.00
Kraft, bleached Canadian	150.00—
Kraft, unbleached southern	120.00—
Kraft, unbleached, Far West	125.00—
Kraft, unbleached Canadian eastern	135.00—
Kraft, semi-bleached southern	130.00—

Quotations on imported wood pulp dollars per short air-dry ton on dock American Atlantic ports, follow:

Bleached sulfite Swedish, freight allowed	140.00—
Bleached sulfite, Norwegian, del'd with limited freight allowance	140.00—
Bleached sulfite, Finnish, freight allowed	140.00—
Unbleached sulfite, Swedish, freight allowed	125.00—130.00
Unbleached sulfite, Finnished, freight allowed	125.00—130.00
Kraft, unbleached, Swedish, freight allowed	125.00—
Kraft, unbleached, Finnish, freight allowed	125.00—
Kraft bleached Swedish, Freight allowed	150.00—155.00
Kraft, bleached, Norwegian	150.00—155.00

PAPER

Quotations are mill quotations Chicago

Book Paper (f.o.b. Chicago, c.l. skids per cwt):	
No. 1 enamels	20.80
No. 2 enamels	19.80
Machine-coated, 45- to 100-lb.	15.55— 19.00

Newsprint (contract base price)	per ton
Rolls, standard	135.00
Sheets	Standard differentials

Knox Felts

KNOX WOOLEN COMPANY

CAMDEN, MAINE

America's First Manufacturer of Endless Paper Machine Felts

For more data circle 135 on Post Card

NAMES IN THE NEWS

Continued from page 321

to handle production and sale of merchant, industrial and converting papers, and G. Lamont Bidwell, Jr., vice president, has been named general manager.

Production and sale of folding cartons primarily for the food fields, will be the responsibility of a new folding carton division to be headed by Chalmers W. Barr, general manager.

The production manager of the flexible packaging division will be E. N. Leonard. Reporting to him will be John Steinbinder, manager of New Jersey converting and Hugh Bonney, manager of Indiana converting.

Kimberly-Clark Corp.

Reorganization changes at the Niagara Falls, N.Y., plant of Kimberly-Clark Corp. have been announced. Thomas Howe, manager of crepe wadding mill at Fullerton, Calif., will become the new manager of operations here over both No. 1 and No. 2 mills.

Clark Hook, production superintendent, will be transferred to the position of labor relations supervisor in the personnel division at Neenah, Wis. He will be replaced in the No. 1 mill by Frank Loppnow, who was assistant director, printing, paper manufacture at the Neenah office.

Superintendent of No. 2 mill will be Carl Swiston, of Memphis Hill, where he was superintendent of crepe wadding manufacturing.

Bailey Meter Co.

Ralph K. Johnson, application engineer in the proposition department of this company, has been transferred to the pulp and paper division in East Orange, N.J. Johnson will specialize in the application of Bailey products and systems serving the pulp and paper industry in the eastern regions.

Plus features of the Slide Washer

- Practically maintenance free operation!
- Power economy plus!
- Low, low "first cost"!

Whether as a washer, a saveall, or thickener, the Kalamazoo "Side Hill" Washer will give you a better and more effective wash job than any other method available today.

These units are especially designed for each installation and fabricated of top quality materials. Installation supervision furnished upon request. Laboratory units available for experimental purposes in determining proper angles and screen mesh.

FREE cost estimates and names of other installations upon request.

WOOD TANK DIVISION

Kalamazoo TANK & SILO CO. 501 Harrison St. Kalamazoo, Mich.

For more data circle 136 on Post Card

NECROLOGY

Gay R. Levis

Gay R. Levis was vice president and treasurer of John A. Levis & Son Inc., Rochester, N.Y., a paper box manufacturer. He entered his father's box manufacturing business in 1922.

Albert S. Goodrich

Albert S. Goodrich was former chief engineer of Hammermill Paper Co., Erie, Pa. He had been with the company for more than 38 years and had been retired for the past two years.

Robert J. Askin

Robert J. Askin was executive vice-president of development, engineering and services for Abitibi Power & Paper Co. Ltd., Toronto, Ontario.

Cyrus E. Roberson

Cyrus E. Roberson, who had been employed by Noble and Wood Machine Co. of Hoosick Falls, N.Y., for the past 52 years, died. Roberson was well known throughout the pulp and paper industry, representing this company for more than 40 years in various capacities in both sales and service throughout the U.S. and Canada.

Charles P. Raymond

Charles P. Raymond, for over 55 years president and manager of the Charles P. Raymond Service Inc., of Boston, Mass., died. The company was a confidential employment service for textile, paper and pulp mill executives.

INDEX TO ADVERTISERS

Albany Felt Company
Allied Chemical Corp., General Chemical Division ... 3rd Cover
American Defibrator, Inc.
American Oil Company ... 285
American Potash & Chemical Corp. ... 286
American SF Products, Inc.
Anglo-American Clays Corporation
Anheuser-Busch, Inc.
Antara Chemicals
Appleton Wire Work, Inc.
Appleton Wood Products Co.
Archer Blower & Pipe Co., Inc.
Asten-Hill Mfg. Co. ... 2nd Cover
Atlas Refinery, Inc.

Babcock & Wilcox Co., The, Tubular Products Div.
Bailey Meter Company
Barrett-Cravens Company
Bauer Bros. Co., The ... 296
Beloit Iron Works ... 303-304
Black-Clawson Company, The ... 311

Cameron Machine Company
Carthage Machine Co. ... 339
Celgar Limited
CIBA Company, Inc.
Classified Advertising ... 334, 335
Clinton Corn Processing Co.
Conoflow Corporation
Crane Packing Company
Curtiss-Wright Corporation

Dempster Brothers ... 326-327
De Zurik Corporation ... 328
Diamond Power Specialty Corp.
Dow Chemical Co.
Dow Corning Corporation
Draper Brothers Company
Du Bois Chemicals, Inc.
Dusenbery Company, Inc., John

Egan & Co., Frank W.

Fabri-Valve Company of America
Fairbanks, Morse & Company ... 323
Fibre Making Processes, Inc.
Fiske Brothers Refining Co., Lubriplate Div. 319
Fluidizer Division of Daffin Corp. ... 318
Foote Bros. Gear & Machine Corp.
Fritz Publications, Inc. ... 335

General Dyestuff Company
Georgia Kaolin Company
Goslin-Birmingham Mfg. Co., Inc.
Great Lakes Carbon Corp., Dicalite Dept.

Hamblet Machine Co.
Hanchett Manufacturing Co. ... 301
Horton Manufacturing Company, Inc.
Hubinger Company, The
Humphrey Elevator Company
Huyck Felt Co. ... 293

Illinois Gear & Machine Co.
Improved Machinery, Inc. ... 294
Ingersoll-Rand

James Gear Mfg. Co., D. O.
Jamesbury Corp.
Jenkins Sons, Inc., M. W. ... 334
Johns-Manville
Johnson Corporation, The
Jones Corporation, E. D.

Kalamazoo Tank & Silo Co. ... 338
Kamyr, Inc.
Knox Woolen Company ... 337

Lamb-Grays Harbor Co., Inc. ... 314
Langston Co., Samuel M.
Layne & Bowler, Inc.
Lehmann Co., Inc., J. M. ... 320
Lindsay Wire Weaving Co., The
Link-Belt Company ... 291
Lodding Engineering Corp.
Lubriplate Div., Fiske Brothers Refining Co. 319

Main, Inc., Charles T. ... 334
Marathon, Div. of American Can Co. ... 288
Moisture Register Co. ... 327
Moore & White Company
Mount Vernon Mills, Inc.
Mullis Eng. & Mfg. Co., Carl W.
Murray Mfg. Co., D. J. ... 297

National Perforating Corp. ... 335
National Safety Council
Naylor Pipe Company
Nichols Engineering & Research Corp.
Noble & Wood Machine Company
Norton Company

Orr Felt & Blanket Co.
Overly's Incorporated

Paper Converting Machine Company ... 290
Paper Industry, The ... 335
Parsons & Whittemore Inc.
Penick & Ford, Ltd., Inc. ... 331
Perkins & Son, Inc., B. F. ... 4th Cover
Photovolt Corporation ... 329
Poirier Control Company
Porter Company, Inc., H. K. ... 330
Portland Copper & Tank Works, Inc.

Red-Ray Mfg. Co., Inc.
Reichhold Chemicals, Inc.
Riverside Alloy Metal Div., H. K. Porter Company, Inc. ... 330
Ross Engineering, J. O.
Ross Midwest Fulton Corp.

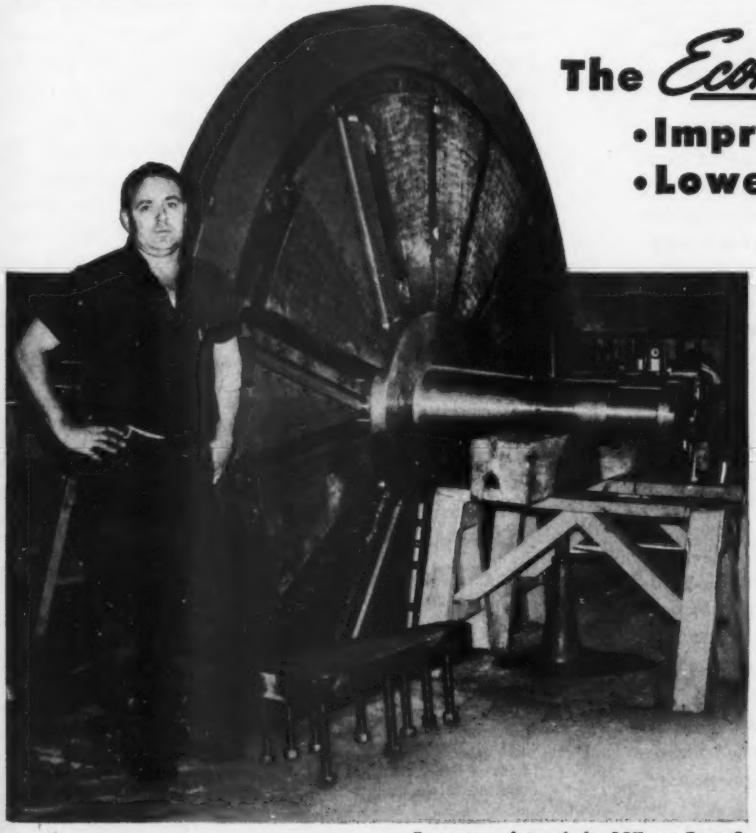
Sandy Hill Iron and Brass Works
Scapa Dryers, Inc.
Shuler & Benninghofen ... 317
Sinclair Company, The
Smidth & Co., F. L. ... 292
Sonoco Products Company
Spraying Systems Co.
Staley Mfg. Co., A. E.
Stebbins Engineering & Mfgr. Co. ... 329
Steinen Mfg. Co., Wm., Industrial Nozzle Div.
Stickle Steam Specialties Co. ... 324
Swenson Evaporator Company

Taylor-Wharton Co.
Tennessee Corporation ... 336
Texas Gulf Sulphur Co.
Textile Paper Products Inc.
Transall, Inc.

Union Asbestos & Rubber Co.

Valley Iron Works Corp. ... 332
Vanderbilt Co., R. T.
Van Products Co.
Vulcan Iron Works Inc. ... 335

Weyerhaeuser Co.
Whiting Corporation
Whitney Chain Company
Williams-Gray Company
Wisconsin Wire Works



The *Economical* Way to
•Improve Chip Quality
•Lower Chipping Costs

Equip your standard chipper with a Norman Disc

There's a good chance that your standard chipper can be equipped with a Norman disc. That means a high percentage of "to-size" chips, fewer compressed or bruised chips – and ½% to 1% less sawdust. That means a real saving. In addition, knives last longer and cost less.

You probably won't have to change the present foundation or conveyor.

It Will Pay You to Find Out!

CARTHAGE MACHINE CO.
CARTHAGE, NEW YORK

For more data circle 137 on Post Card

whither?

in production
processes
new products
markets

Male gypsy moths — beware of "gyplure"

To keep gypsy moths from mating, Agricultural Research Service scientists are experimenting with gyplure as a new approach to the control of this destructive leaf-eating insect pest of the Northeast forests.

Gyplure is a synthetic attractant that attracts the male gypsy moth as effectively as does the natural attractant possessed by the females of this species.

In addition to spraying forest areas with gyplure — designed to confuse the male moths and keep them away from the females — newly-designed, throw-away paper traps are now being tested. These are waxed-paper cups fitted with a wick to hold the attractant and a sticky substance to capture the moths lured into the traps.

Gyplure is readily available and inexpensive. An ounce of this chemical, which is equivalent to the amount of natural attractant obtainable from 30 million female moths, costs only 60 cents and is enough to bait more than 2 million traps.

Scientific measurement of forest mechanization

With the use of a newly devised common denominator for the many types of machines used in logging, A. M. Koroleff of the Pulp and Paper Institute of Canada has introduced a scientific approach to the measurement of forest mechanization.

Applying the horsepower-day concept in equating the work product of tractors, trucks, cranes, winches, loaders, plows, slashers, power saws, etc., he showed that the pulp and paper industry of the Eastern provinces of Canada used 184.4 million horsepower-days at a cost of $78 million during the 1959-60 logging operations. This compares to the use of 65 million horsepower-days at a cost of $24 million in the 1949-50 season. It was also found that machine-hours exceeded man-hours by a ratio of 26:1 in the 1959-60 season as against a ratio of 6:1 in the 1949-59 season.

Extensible-paper improvements

Great improvements in extensible-paper properties have been made in the past two years. These improvements have given this paper the ability to resist stretching under normal converting operations while retaining these characteristics, and consequently its high resistance to breakage, in multiwall bag service.

Compared to the regular kraft bags, the multiwall bags now produced with extensible-paper feature overall lower basis weight, elimination of one paper ply, and superior performance. The savings on basis weight of extensible-paper is reported to be 16.5 per cent.

Increased use of cotton linters

Partly as a result of new developments and new processing methods, cotton linters and modified cotton linters are coming into greater prominence in the paper industry, according to Glen I. Stelzer of Hercules Powder Co. Inc.

High bulk, good porosity and absorbency of cotton linters pulp make this a very suitable material for absorbent grades of paper. Its other properties — such as good color, high brightness, cleanliness and high purity — are added advantages sought by the papermaker.

Newsprint production up

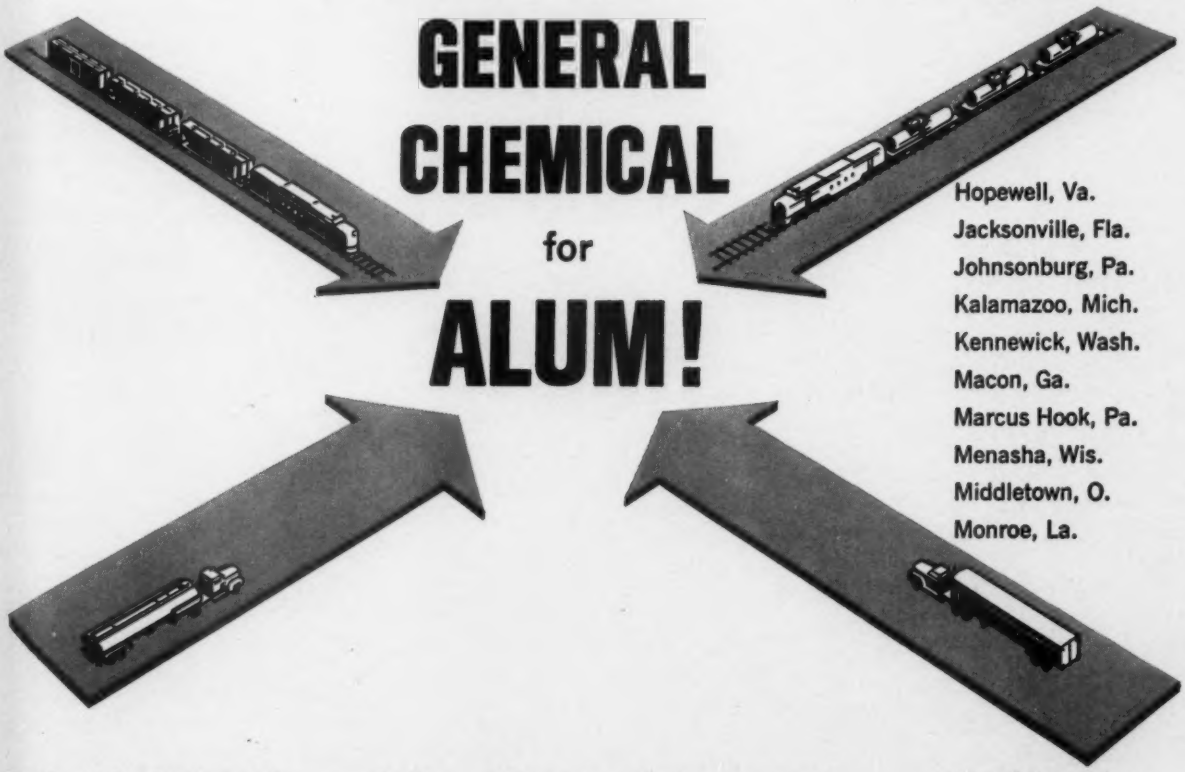
Production of newsprint in North America in the first five months of 1961 amounted to 3,652,378 tons which was 1.5 per cent higher than the output during the corresponding period in 1960. U. S. newsprint output in the first five months of 1961 totaled 882,332 tons or 3.7 per cent above the corresponding 1960 level, while Canadian production amounted to 2,770,046 tons or 0.9 per cent higher than the output in the first five months of 1960.

CORRECTION: Our July issue editorial refers to the installation of a Rotoformer in the Beloit Research Center. This, of course, is an error since the Rotoformer is manufactured by Sandy Hill Iron & Brass Works. The Beloit machine is the Beloit-Stevens former.

Multiple Sources— Extra Reliability!

...when you call on

GENERAL CHEMICAL for ALUM!



Look at the Southeast, for example. Here we have *nine plants* to meet your alum requirements with speed, efficiency . . . and certainty. Similar multi-source supply patterns exist in other major consuming areas. These interacting supply sources assure dependable delivery, where and when you want it . . . providing an extra measure of reliability in emergencies.

General Chemical *liquid* alum is notably pure, low in insolubles and iron. Our *dry* alum is exceptionally uniform in strength, free-flowing and readily soluble.

For extra quality, extra dependability in alum, always call on General Chemical!

FOR YOUR ALUM NEEDS... 29 GENERAL CHEMICAL PLANTS

Atlanta, Ga.
Barnet, B.C.*
Chillicothe, O.
Cleveland, O.
Denver, Colo.
Detroit, Mich.
E. St. Louis, Ill.
El Segundo, Calif.
Hopewell, Va.
Jacksonville, Fla.
Johnsonburg, Pa.
Kalamazoo, Mich.
Kennewick, Wash.
Macon, Ga.
Marcus Hook, Pa.
Menasha, Wis.
Middletown, O.
Monroe, La.
New Orleans, La.
Pine Bluff, Ark.
Port Arthur, Ont.*
Port St. Joe, Fla
San Francisco (Port Chicago) Calif.
Savannah, Ga.
Tacoma, Wash.
Thorold, Ontario*
Vancouver, Wash.
Wisconsin Rapids, Wis.
Valleyfield, Quebec*

*In Canada: Allied Chemical Canada, Ltd.

Allied Chemical

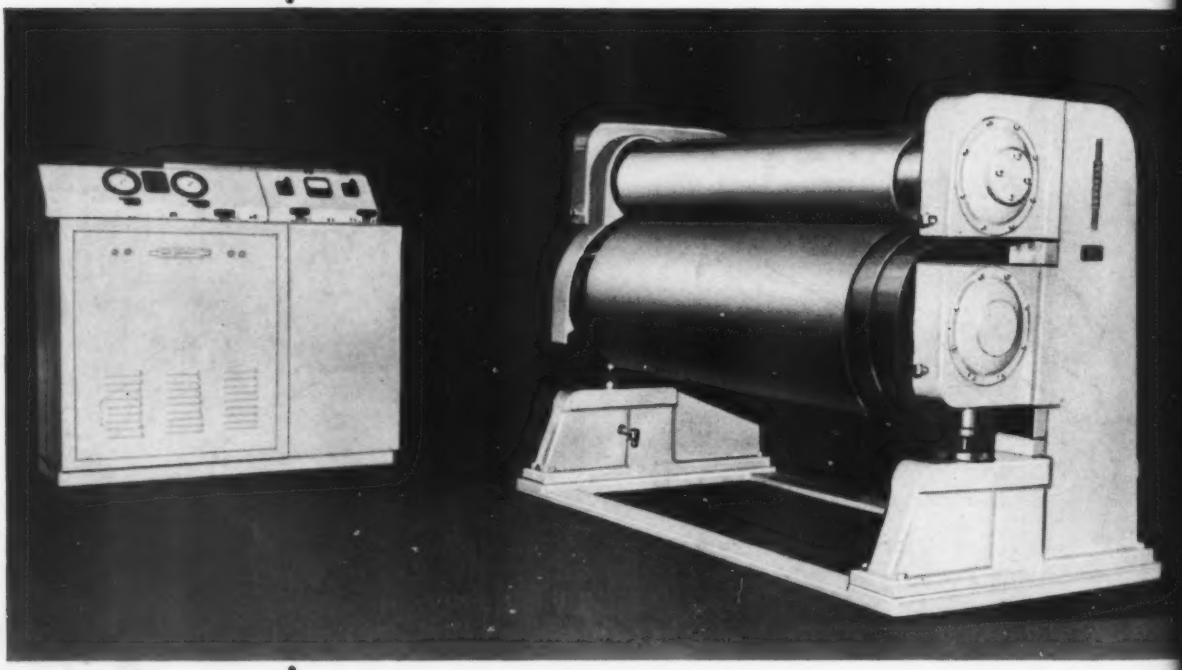
GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N.Y.

For more data circle 138 on Post Card

PERKINS *Announces* a new line of High Speed Embossers

with these advanced features . . .

1. Quick and easy roll changes.
2. All welded steel construction.
3. Self-aligning roller bearings.
4. Large rolls for minimum distortion under pressure.
5. Independent pressure control of both sides of calender.



These calenders can be made as single Embossers as shown, and as double Embossers with two sets of rolls.

They can be furnished with center or surface windup and with air brake type unwinds.

THE WORLD'S LARGEST MANUFACTURERS OF CALENDER ROLLS

B. F. PERKINS & SON, INC.

HOLYOKE • MASSACHUSETTS

For more data circle 139 on Post Card